

# The Natural Heritage of Scotland International Comparison of Trends

## Section 1 – Full Report

(Section 2 – Fifteen Comparison of Trend Profiles in separate document)

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Prepared by

Adrian Newton, Gemma Smith, Philip Bubb, Mandar Trivedi

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**SCOTTISH  
NATURAL  
HERITAGE**



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UNEP-World Conservation Monitoring Centre  
219 Huntingdon Road, Cambridge, CB3 0DL, UK  
Tel: +44 (0) 1223 277314, Fax: +44 (0) 1223277136  
info@unep-wcmc.org    www.unep-wcmc.org



# **The Natural Heritage of Scotland – International Comparison of Trends**

## **Executive Summary**

The natural heritage of Scotland is changing rapidly in response to a range of factors including patterns of land use, pollution, climate, urban development and harvesting of wildlife. Whereas some of these environmental changes are attributable to factors operating at the global scale, such as climate change, others are affected by processes operating at regional or local scales. This raises the question of how trends in the natural heritage of Scotland compare with those observed in other countries. Are recent declines in widespread bird species, for example, something unique to Scotland, or part of a broader trend? Are declines in abundance of rare and endemic plant species occurring in other parts of Europe, or other regions of the world?

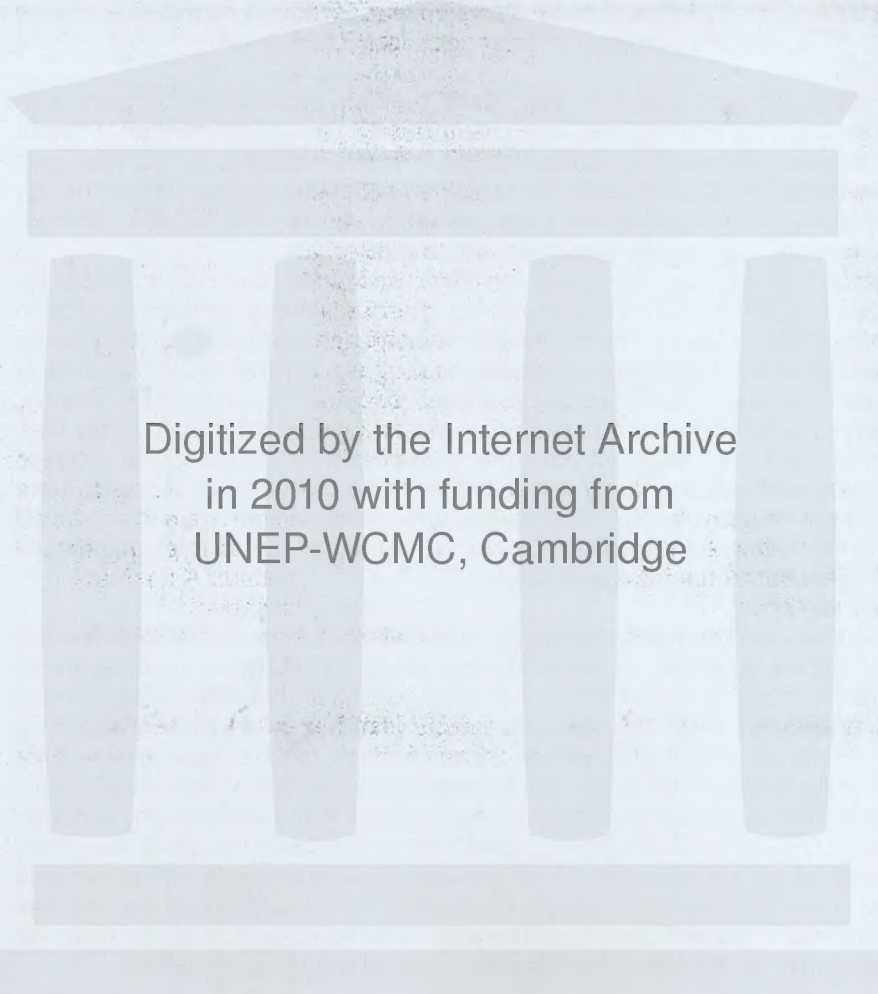
This report illustrates how trends in the natural heritage of Scotland compare with those of other countries and regions. This was achieved by development of 15 'trend profiles' for selected elements of natural heritage. These included: air pollution and critical exceedance levels, land cover, forest cover and native forests, water quality, dotterel, wintering waders, farmland birds, wintering geese, marine fish catches, seals, otter, salmon, capercaillie, corncrake, red and roe deer.

The process of developing the trend profiles highlighted the opportunities for developing such international comparisons, but also identified a number of gaps in available information. One of the principal constraints in producing environmental trend profiles is the low availability of suitable data. Analysis of trends in the state of natural heritage requires information to have been collected in a systematic manner that has been consistently applied over time; in practice, these criteria are rarely met. Comparison of trend data between countries is hindered by the additional problem that assessment methods are rarely consistent between countries. As a result, there are limited cases where precise, quantitative information on an aspect of natural heritage are available of sufficient quality or quantity to enable meaningful comparisons between countries over time.

A review of current environmental reporting obligations was undertaken, to define the extent to which development of trend profiles could contribute to meeting these requirements. This review showed that the volume of environmental legislation has significantly increased over the last 20 years, resulting in increased reporting obligations. However, relatively few of these reports require quantitative data describing trends in natural heritage. The Convention on Migratory Species (CMS) is the only Convention that requests provision of species trend information, although parties to the Convention on Biodiversity (CBD) have also been invited to voluntarily submit information on the status and trends of selected ecosystems and associated components. Trend profiles could clearly be of value in this context. At the regional level, the European Water Framework Directive (2000/60/EC) is likely to offer the clearest opportunity for the use of trend profiles to meet reporting obligations.

Although relatively few reporting obligations require information on trends in natural heritage, profiles provide a valuable tool for comparing national trends with those recorded in other countries and regions, and could contribute to meeting the increasing demand for environmental indicators. For example, a number of countries are now developing and implementing suites of indicators for monitoring progress towards sustainable development targets. However, the development of such targets, and the further development and implementation of trend profiles, will increase the need for systematic monitoring of the state of the environment, an area where there is substantial scope for improvement.





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## SECTION TWO – TREND PROFILES IN SEPARATE DOCUMENT



# The Natural Heritage of Scotland – International Comparisons of Trends

## 1. Introduction

The natural heritage of Scotland is in many ways exceptional. Scotland is home to around 90,000 native species, including some thirty species that are found nowhere else (Usher 1997). Almost half of these species are found in coastal waters (Davison and Baxter 1997). The breeding populations of seabirds and grey seals, together with over-wintering geese, are of international importance, as are the rich communities of 'lower' plants (lichens and mosses) that occur along the Atlantic coast and western isles. Native woodlands, such as the Caledonian pine forests, and moorland, peatland and rough grassland communities, are also recognised to be of importance on an international scale. The rich and varied landscape of Scotland is an important element of the natural heritage, including extensive coastal areas and the glaciated landforms of the Scottish Highlands, which are appreciated internationally for their natural beauty and amenity value.

However, the natural heritage of Scotland is changing rapidly. A detailed summary of recent trends is provided by Mackey *et al.* (2001). Some 40% of rare and endemic plant species have declined since 1990. Over 40% of native land mammals are thought to be in decline. The geographic ranges of almost one third of terrestrial and freshwater bird species have declined since 1970; some 16% of widespread species have declined significantly in abundance within the last decade. Such declines in species have been accompanied by major changes in land use and land cover, including an increase in land devoted to agriculture, forestry and urban development. As a result, since 1947, the area of semi-natural habitat has declined by an estimated 17%. At the same time, use of the natural heritage of Scotland as an amenity has increased substantially; for example between 1994 and 1998, the number of visits by Scottish adults to the coast or countryside increased from 105 million to 137 million.

Some of the environmental changes occurring in Scotland can be viewed as elements of more widespread changes, which are occurring at the regional or global scale. For example, eutrophication and photochemical pollution affect habitats throughout much of northern and central Europe (Stanners and Bourdeau 1995). Other major changes in the environment, such as climate change and loss of biodiversity, can be considered as trends that are occurring on the global scale. This raises the question of how trends in the natural heritage of Scotland compare with trends observed in other countries. Are declines in widespread bird species, for example, something unique to Scotland, or part of a broader trend? Are declines in abundance of rare and endemic plant species occurring in other parts of Europe, or other regions of the world?

In this report, we attempt to place trends in the natural heritage of Scotland in an international context, with the following aims:

To demonstrate and assess where international information networks can provide trend information that is relevant to comparing and interpreting natural heritage trends, for example relating to nature conservation and biodiversity, in Scotland.

To document international trends alongside Scottish trends, in the form of 'trend profiles', which encapsulate information in summary form and address the question 'how does Scotland compare with other countries and regions?'. These profiles incorporate and further extend the trends documented by Mackey *et al.* (2001), which related exclusively to Scotland.



To assess opportunities, gaps and priorities in the development of a modular information system of natural heritage trend profiling in Scotland. This is with the intention of streamlining the preparation and use of information for state of the environment reports, sustainability indicators and the delivery of international reporting obligations.

To show how trend profiles and reports could be utilised for reporting by SNH and others when accessed directly from the SNH web site.

In the next section of this report, we describe the methods that were used in developing trend profiles, enabling comparison of Scottish trends in natural heritage, with those reported from other countries. We then present detailed profiles for fifteen selected aspects of the natural heritage. International reporting obligations are then considered in detail. Finally, conclusions are drawn regarding the development and application of trend profiles, and their potential contribution to environmental reporting.

## **2. Methods employed in the development of trend profiles**

### *2.1 Selection of topics for the 15 trend profiles*

Selection of the themes to be profiled was based in the first instance on the natural heritage trends available for Scotland (Mackey et al. 2001). In order to test the strengths and weaknesses of the approach, a range of trends were chosen to cover different aspects of Scotland's natural heritage. Seven trends cover individual species or pairs of similar species (red and roe deer, grey and harbour seals). These species are either UK Biodiversity Action Plan (BAP) species (capercaillie, corncrake, otter) or of major economic and cultural importance (e.g. salmon). Species were also selected as indicators of the quality of important habitats in Scotland - seals for the marine environment, otter for freshwaters, capercaillie for native pine forest, and corncrake for traditionally managed meadows. Three groups of birds were selected as indicators of major aspects of Scottish natural heritage and for which trend data exists across Europe - farmland birds, wintering geese and wintering waders. A trend in marine fish catches was included as a widely accepted indicator of the marine environment.

Trends in major land cover types, freshwater quality, forest cover, air pollution and critical exceedance levels were selected as major elements of the natural environment that influence many other aspects of natural heritage. Trends in air pollution and freshwater quality represent pressures on the natural heritage, rather than its actual state. Data are collected across Europe for concentration of pollutants rather than their impacts on natural habitats. These limitations are being addressed by the modelling of the critical load exceedance limits of natural habitats to the cumulative effects of air pollutants, and monitoring systems for freshwaters which include biological criteria (e.g. macroinvertebrate populations).

Data availability exerts a major constraint on the selection of trends for comparison. The subjects chosen for the trends are mostly based on bird and mammal species. Comparable data for the identification of trends in plants and invertebrates is much less readily available. The scope of the trend topics was similarly limited by the available data. For example, the land use profile primarily considers farmland and changes in European agriculture.

### *2.2. Identification of data sources*

For each trend topic, searches for data were made that enabled comparisons to be made of trends in distributional range or abundance of the species, or extent of the



issue being examined across Scotland, the UK, the rest of Europe, and sometimes globally. Data searches were conducted using references supplied by SNH, the library resources of UNEP-WCMC, and the internet. For many of the species-based trends, national experts or international working groups were identified and contacted for the most recent data and reports. A major source of data and analyses of the European environment was the European Environment Agency website (<http://www.eea.eu.int/>) and reports such as the *Dobris Assessment* and the annual *Environmental Signals* reports. BirdLife International and Wetlands International were the principal source of data and contacts for trends on birds.

### 2.3. Acquisition of data sources

Data were obtained principally via the internet and published resources. This was supplemented by requests to national and subject experts and information centres, e.g. Wetlands International for wintering waders and geese. The International Council for the Exploration of the Sea (ICES) is the major data source for the marine environment, including salmon and marine fish catches and seal populations.

### 2.4. Presentation of the trend profiles.

For the species-based profiles a trend summary table was compiled. This summarised the available information on the status, trends and explanation of change of the species in Scotland, the UK, Nordic countries, Europe, and sometimes globally. This table also included comments on the compatibility of data. The inclusion of Nordic countries and the global situation depended on the range of the species concerned and the relevance of a comparison at these scales.

For each profile, graphical and map-based summaries of the trends were presented wherever possible. These were sometimes reproduced from published sources. For the species-based profiles new analyses and graphical presentations were made. This was based as far as possible on existing forms of presentation. For example, the maps of Europe showing national populations and trends for breeding birds are based on those produced by BirdLife International (Tucker and Heath, 1994).

Each profile included a section on interpretation of the trends identified, both in terms of differences between regions and the reasons for the trends. This was summarised to address the question: 'How does Scotland compare?'



### 3. Assessment of reporting obligations

This section provides an overview of reporting obligations, relevant to Scotland. This is provided in order to evaluate the contribution that trend profiles could make to environmental reporting, which is considered in a later section.

#### 3.1. Overview of reporting obligations

The United Kingdom is party to over 50 international conventions and agreements relating to biodiversity, nature conservation and the environment, as well as many European Directives and Regulations on nature and the environment. Many of these legislative measures require member states to report on the status of implementation of such legislation and / or provide information (contextual or statistical) on components of the environment that are covered by such legislation.

Every environmental convention requires some form of reporting by Contracting Parties. As part of the United Kingdom, Scotland is subject to reporting obligations. Countries are obliged to fulfil the reporting requirements of a large number of multilateral environmental agreements (MEAs), (such as the Convention on Biological Diversity – CBD). Reports may be periodic (annual, biennial, triennial or even six yearly), or may be required only once to provide information on special issues or unique events (i.e provide information on the status of a country's forest ecosystems, the occurrence of specially protected areas in a country). For the Secretariats and management authorities of such Conventions, these reports are the primary source of information used to monitor and facilitate a convention's implementation, as well as assisting contracting parties in reaching their development and sustainable development goals.

As the number of conventions and agreements has multiplied, so the information demands on countries has increased. The expansion of reporting obligations means that information demands are becoming more numerous, more complex and more diversified.

In an effort to make reporting more effective and more manageable UNEP and other UN and non-UN institutions are now collaborating by harmonising both the information requirements and the reporting formats of many MEAs, particularly those relating to global biodiversity.

The European Environment Agency (EEA) is working on a range of projects that are looking at reporting obligations and mechanisms at national and community level. These include:

The EEA Reporting Obligations Database (RODS) (currently under development), that aims to inventory all obligations, both legal and moral, resulting from reporting requirements and expectations as a categorized and key-worded series of questions or information elements.

As part of the European Environment Information and Observation Network (EIONET), the EEA is testing mechanisms for compilation of information from



multiple sources over the Internet, particularly for use in "state of environment" type reporting for the European region.

The EEA is also working on a project which aims to streamline reporting mechanisms for the 64 environmental agreements to which the European Community itself is party. A substantive report on this work has recently been completed.

The secretariats of the global biodiversity-related treaties are aware of the need to increase access to the information that they manage, and to streamline and harmonisation information management and reporting. For example:

Convention on Migratory Species (CMS): Over the years the CMS (<http://www.wcmc.org.uk/cms/>) and its associated regional agreements (EUROBATS, AEWA, ASCOBANS and others) have developed approaches to reporting and information management that, although similar, are not integrated. The CMS Secretariat is now leading efforts to synthesise and integrate the information contained in the national reports (CMS and associated agreements) provided to the secretariats, and is developing a more integrated approach to reporting on migratory species. The more thorough synthesis of the national reports is also leading to a helpful review of implementation of the Convention.

Following on from this initial synthesis, in 2002, the UNEP World Conservation Monitoring Centre has been working in close collaboration with the CMS Secretariat to develop and refine the Convention's reporting format. At present, Parties to the convention are voluntarily using the new reporting format (agreed by the CMS Standing Committee at its 23<sup>rd</sup> Meeting in Bonn, December 2001) on a trial basis. It is anticipated that the new format will be formally approved at the Conference of the Parties (COP 7) in Bonn in September 2002. Countries are required to provide information on any research, monitoring, habitat protection and habitat restoration occurring in their country relating to CMS listed species. Parties are also required to indicate whether they are a range state for identified Appendix II listed species. Where they are, a published distribution reference is also required. Population information for Appendix II listed species may be voluntarily supplied as an annex.

Convention on Biological Diversity (CBD): The CBD Secretariat (<http://www.biodiv.org/default.asp>) has taken a lead in ensuring that not only are all the reports submitted to the secretariat available on-line, but that there are also search tools that facilitate access to the information that the reports contain. In addition, the second round of national reports are formatted to provide a checklist of those actions that a Contracting Party is obliged or requested to undertake as a result of Convention Articles or conference decisions, moving away from a text-based report to a questionnaire.

Ramsar Convention on Wetlands of International Importance: For many years the Ramsar Convention Bureau (<http://www.ramsar.org/>) has provided Parties with clear guidance on how to prepare national reports. In 1999, 107 out of a possible 110 Parties submitted national reports (three were exempt), and all of these reports are available online. The guidelines have evolved over the years, and now focus tightly on the strategic plan. The latest version of the reporting tool is now also being



developed as a planning tool for implementation of the strategic plan at the national level. As of August 2002, 112 reports have been submitted using this new format (from a possible 133 Contracting Parties), in preparation for the next Conference of the Parties (CoP 8) in November 2002.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): CITES (<http://www.cites.org/>) has provided "Guidelines for the Preparation and Submission of CITES Annual Reports" since 1994 (comprehensively revised in 1999), and is now exploring how the quality of annual reports might be improved, how the data might be better presented and used, and how to ensure timely submission. The Secretariat has begun studying the submission rates and contents of biennial reports, with a view to developing guidelines for these reports too.

World Heritage Convention: The World Heritage Convention (<http://whc.unesco.org/nwhc/pages/home/pages/homepage.htm>) has only recently begun a periodic reporting process, with reports being submitted once every 6 years. Reporting formats and associated explanatory notes were adopted in 1998. Currently the results of regional reports for Africa and the Arab states are being reviewed. Experiments are beginning on reporting using web templates, and some discussion has been entered into on linking this to management of information on individual sites via the Internet.

The UNEP World Conservation Monitoring Centre (UNEP-WCMC) has been working closely with the both the CBD and CMS Secretariats on the development or improvement of national reporting guidelines. It has also begun to explore and develop a range of pilot projects looking at consolidated reporting to a range of agreements; modular reporting approaches; and the link between reporting to international agreements and the state of environment reporting process. An additional pilot project will address information management to support the delivery of reports, and assess the assistance that might be valuable from regional organisations.

### *3.2: Identification of Scotland's Reporting Obligations*

SNH and other national government agencies and scientific research institutes have been involved in monitoring various "natural heritage" elements for many years. Biodiversity data cover a wide range of subject areas and timescales. Given that many biodiversity and environmental related conventions, agreements and regional legislation require obligatory reporting on specific natural heritage elements on a regular basis, SNH has identified the need for a clearer specification of biodiversity and environmental legislative reporting obligations.

As a first step towards identifying such opportunities, a review was made of the international and regional (EU) environmental and biodiversity legislation that Scotland is currently subject to (as part of the United Kingdom).

Research undertaken as part of this study confirmed findings of the The Orbis Institute and UNEP-WCMC (2002), that at present, there is no singular, central repository that provides detailed information on international and regional conventions and legislation in the combined area of biodiversity, natural resources and the environment. Indeed, no organisation is specifically mandated to provide a comprehensive global source of information on environmental legal material.



At present, information is available from a variety of electronic and hard copy sources at national (government), regional (EU) and global (inter-governmental) level. International information centres that can assist in the provision and identification of such information include the European Environment Agency (EEA <http://www.eea.eu.int/>), International Conservation Union (IUCN <http://www.iucn.org/>) and European Centre for Nature Conservation (ECNC <http://www.ecnc.nl/>).

These organizations provide several on-line information networks (such as ECOLEX and EUR-Lex), that identify key international conventions, agreements and regional directives. ECOLEX ([www.ecolex.org/](http://www.ecolex.org/)) is a joint UNEP and IUCN information service providing internet-based access to international and national environmental law information. Initiated in 1997, it is hosted by IUCN's Environmental Law Centre in Bonn. EUR-Lex (<http://europa.eu.int/eur-lex/en/>) is an internet portal developed to provide a single entry point for online consultation of European Community legislation.

Using ECOLEX, EUR-Lex, ECNC and EEA information sources, global and regional (EU) biodiversity and environmental legislation relevant to Scotland was identified. Several basic assumptions were made in order to focus the identification process, namely:

Has the convention, agreement or EU legislation been ratified by the United Kingdom?

Does the legislation cover some type of biodiversity, natural resources or broad environmental topic area (plant and animal species protection, air pollution, water quality)?

Does the legislation apply to Scotland or the UK's immediate environment (for example within Europe, rather than applying to species protection in Antarctica, or protected areas legislation within the wider Caribbean)?

Once identified, selected legislation was then subject to further detailed examination of its texts and articles to identify key reporting obligations that Scotland (as part of the UK) is subject to. For the purposes of this study, the concept of 'reporting obligation' has been interpreted as being a report or the provision of specific information that is to be submitted to a Secretariat or other administrative body established by the Convention, agreement or EU directive. Provisions for the exchange of information between Parties has not been included.

Over 150 pieces of environmental legislation were reviewed. Relevant reporting obligations were recorded in an Excel spread sheet to enable information requested of national authorities to be easily identified. Information recorded included:

Name of instrument / legislation

Instrument aim

Reporting obligation

Description of reporting obligation information need (e.g. provide list of protected bird species, provide list of threatened habitats within contracting party, provide quantitative data on atmospheric pollutants)

Reporting frequency (one time, annual, every two or three years)

Article or paragraph where reporting obligation is identified

Geographic coverage (Global, EU, specific countries)

Internet (URL) location for further information on the convention or environmental legislation



Key international environmental conventions to which the United Kingdom is party are identified with their reporting requirements in Annex 2. Many legislative instruments are in force in the EU in regard to natural resources, biodiversity and the wider environment, the most significant of which are the Birds Directive, the Habitats Directive and the recently approved Water Framework Directive. The reporting requirements for these key EU Directives are identified in Annex 3. A timetable of the UK International Conventions Reporting Commitments for 1998-2006 is presented in Annex 4.

The principle types of legislative instrument in the European Community are Regulations, Directives, Decisions, Recommendations and Opinions. Regulations are directly applicable and binding in all EU Member States without the need for any national implementation legislation. Directives bind Member States as to the objectives to be achieved within a certain time-scale, while leaving the national authorities some choice in the form and means to be used. Directives have to be implemented in national legislation in accordance with the procedures of the individual Member States. Decisions are directly binding in all their aspects on the party to which they are addressed. Consequently decisions do not require national implementing legislation. A decision may be addressed to any or all Member States, to enterprises or in some cases to individuals. Recommendations and opinions are not binding.

#### 4. Overview of environmental indicator reports

A review of key wildlife, environmental and indicator reports and electronic information sources is presented here, to provide a checklist to summarise opportunities, feasibility and priorities for further development of trend profiles.

Since the early 1990's there have been many regional efforts, particularly at the Pan-European scale, which have attempted to assess the quality and state of the natural environment, in response to many of the pressures placed upon natural ecosystems by anthropogenic activities. The European Environment Agency (EEA) has been particularly successful with such efforts. The production of the *Dobbris Assessment* and associated statistical compendium (EEA, 1995), *Europe's environment: the second assessment* (EEA 1998), *Environment in the European Union at the turn of the century* (EEA 1999) and the *Environmental Signals* series (EEA 2000, EEA 2001), are key publications that aim to provide such information to policy makers and the general public.

Each of these assessments and several other key national texts were reviewed in detail to determine the natural heritage elements that they contained, thus aiding in the process of developing an initial index to information sources. Information was recorded in an Excel spreadsheet, and included the following:

- Name of Report (reference)
- Website (URL) location
- Natural heritage of environmental element described (inland waters, species populations, marine water quality, land use, agriculture, air quality)
- Detail on element described (e.g. air quality – sulphur dioxide emissions data)
- Location of data in reviewed report (page number and / or URL)
- Timeframe of information (year/s)
- Geographic coverage (Global, EU, EU 15, EEA member state)
- Source of original data



This review process indicated a common pattern of broad environmental and biodiversity thematic areas, for which quantitative, time-series data is fairly readily available. These are summarised in Box 1.

**Box 1.**

Forest resources (forest cover, round wood production, forest health e.g. scale of defoliation)  
 Land use (agricultural area, forest area, area under agri-environment schemes)  
 Marine pollution (eutrophication levels, pollution levels of hazardous substances)  
 Marine fisheries data (total landings)  
 Freshwater quality (eutrophication, BOD levels, pollutant levels)  
 Freshwater resources (total water abstraction)  
 Air quality (emissions data)  
 Emissions of ozone depleting substances  
 Climate change (emissions data)

Data on biodiversity components such as globally threatened species (animals, birds and plants) are frequently reported in such assessments at a single time only, i.e. a snapshot of their state is provided, with no details of when this snapshot was made or refers to.

In addition to international, regional or national reporting obligations and European-wide assessments, there are also a number of other international organisations that many European Member States are members of, or co-operate with, that instigate regular biodiversity monitoring programmes, or collect, collate, report and disseminate national environmental monitoring data and information. While often not legally binding, many such initiatives are long-established, relying on the goodwill of a country to engage in such activities, often enabling inter-governmental agencies or institutes to fulfill their mandates. While far from comprehensive, examples of such initiatives are summarised in Table 1; further information is provided on these assessments in the following paragraphs.

*Table 1. Regular natural heritage assessments*

Assessment Name	Responsible Organisation
OECD / Eurostat Joint Questionnaire	OECD/Eurostat
UNSD Questionnaire on Environmental Statistics	UN Statistical Division
Forest Resources Assessment (FRA)	UN Food and Agriculture Organisation (FAO)
Annual Fisheries Catch Data	ICES
UN List on Protected Areas	IUCN WCPA / UNEP-WCMC

*OECD / Eurostat Joint Questionnaire*



The Organisation for Economic Co-operation and Development (OECD) has developed a questionnaire on the State of the Environment that since 1988 has been jointly presented with that from the European Community Statistical Office (Eurostat), known as the joint EUROSTAT/OECD questionnaire (OECD / Eurostat 2000).

The questionnaire is sent to OECD member states every two years. Data provided by member countries is used to monitor environmental changes and environmental performance in OECD countries, to promote international harmonization of environmental data, and to improve national environmental information systems. Data are gathered every two years.

The main objective of the questionnaire is to gather the best available environmental data in member countries, and to promote international harmonisation of these data. Data are used to update the OECD database on resources and the environment (SIREN), contribute to the biennial OECD compendium of environmental data and contribute to the development of environmental indicators, to environmental performance reviews and to environmental outlook work. This work is further meant to respond to the wishes of Member countries governments that agreed at the 1991 meeting of the OECD Environment Ministers to ensure through appropriate co-ordination the development of objective, reliable and comparable environmental statistics and information at international level (OECD/Eurostat 2000).

For Eurostat and the countries of the European Union, associated EFTA and candidate accession countries the questionnaire provides data for Eurostat and European Environment Agency (EEA) publications on the environment, contributes to ongoing work on environmental indicators and contributes at international level to the work of the Commission of the European Community on environmental policy.

Participating countries are required to submit information and data on air, inland waters, marine environment, land, forest, wildlife, waste and noise.

#### *UNSD Questionnaire on Environmental Statistics*

The United Nations Statistics Division Questionnaire on Environmental Statistics is part of the biennial UNSD data collection for all those countries not covered by the Joint OECD/ Eurostat Questionnaire. The questionnaire contains questions under the following headings:

- Water resources, use, pollution and quality
- Air pollution and ambient air quality
- Waste generation and treatment
- Land use and land degradation

The objective of the United Nations Statistics Division's (UNSD) Questionnaire on Environment Statistics is to collect, in a uniform manner, the best available environmental data and statistics for international purposes. The UNSD Questionnaire focuses on selected fields of environment statistics that are not covered by other international data collection activities and addresses all countries except those who report environment statistics to OECD and the Statistical Office of the European Union (Eurostat).

The data collection contributes to the development and regular update of the UNSD Environment Statistics Database, which will be used for the planned biennial UNSD Compendium of Environment Statistics and Indicators and will be made available to



countries, United Nations specialized agencies and other regional and international institutions.

UNSD undertook the first international compilation of environment statistics in 1999. The current questionnaire (2001) benefits from the experiences gained, comments and suggestions received from countries as well as from close cooperation with OECD and Eurostat. It also draws upon the methodological work of other international organizations and intergovernmental bodies.

#### *FAO Global Forest Resource Assessment*

The United Nations Food and Agriculture Organisation (FAO) has been collecting data on forest resources (area (ha), forest management, timber production and trade and forest cover change) for over fifty years (FAO 2001). Member countries submit national forest data to FAO on a voluntary basis. Data are not always submitted by countries, therefore where this occurs, FAO attempts to make its own estimates. Intervals of data collection can vary between countries from a minimum of five years, to a maximum of ten years. The FAO Global Forest Resource Assessment is an example of a FAO's efforts to provide a comprehensive and up-to-date view of the world's forest resources, using national forest inventory data, supplemented by state-of-the-art technology to verify and analyse the information provided.

#### *ICES Secretariat*

The environment of the North Atlantic and adjacent seas has been a prime concern of the International Council for the Exploration of the Sea (ICES) since its inception in 1902. As the oldest intergovernmental marine science organization in the world, ICES has long recognized the mutual interdependence of the living marine resources and their physical and chemical environment. Although the Council's original statutes have undergone occasional modification to adjust for changing conditions, challenges, and priorities, its main focus has continued to be on international cooperative studies. The principal functions of ICES are formally identified in its 1964 Convention.

ICES is a leading forum for the promotion, coordination, and dissemination of research on the physical, chemical, and biological systems in the North Atlantic and advice on human impact on its environment, in particular fisheries effects in the Northeast Atlantic. In support of these activities, ICES facilitates data and information exchange through publications and meetings, in addition to functioning as a marine data centre for oceanographic, environmental, and fisheries data. ICES works with experts from its 19 Member Countries and collaborates with more than 40 international organizations, some of which hold Scientific Observer status.

The ICES Secretariat maintains some of the world's largest databases on the marine environment, the status of fish stocks, and catches of fish and shellfish. These databases go back to about 1900 for some oceanographic stations, to about 1980 for biological and contaminant data, and to the late 1950s for the fisheries resources for some stocks. Catch data cover the period 1973 - 2000.

Yearly nominal catches of fish and shellfish are officially submitted by 19 ICES Member Countries in the Northeast Atlantic for over 200 fish species. ICES has published these data in *Bulletin Statistique des Pêches Maritimes* from 1903 to 1987 and for 1988 in *ICES Fisheries Statistics*. As of the year 2000 the data are published on a CD-ROM containing data for the period 1973-2000. The Coordinating Working Party on Fishery Statistics (CWP) coordinates collection of these statistics under the STATLANT programme. The organizations involved are the United Nations Food and Agriculture Organization (FAO), Commission for the Conservation of the Antarctic Marine Living Resources (CCAMLR), Northwest Atlantic Fisheries Organization (NAFO), International Commission for the Conservation of Atlantic Tunas (ICCAT),



Statistical Office of the European Communities (EUROSTAT), and ICES. Data from all these organisations therefore covers the entire Atlantic.

#### *United Nations List of Protected Areas*

The United Nations List on Protected Areas, is the definitive list of the world's protected areas, produced through a partnership between IUCN's World Commission on Protected Areas (WCPA) and the UNEP World Conservation Monitoring Centre (UNEP-WCMC) (IUCN 1998). It is regularly compiled (currently approximately every five years), under the authority of the United Nations, based on resolutions adopted by the UN Economic and Social Council. The list records those national and internationally designated protected areas (according to IUCN protected area categories 1-VI) greater than 1,000ha in size (IUCN 1998). The compilation of the list relies on the voluntary assistance of national protected area management authorities. Existing national protected area data held on the Global Protected Areas Database, at UNEP-WCMC, is sent out for review and updating by national management authorities. The next UN List is due to be completed in 2003, in preparation for the Fifth World Parks Congress being held in Durban, South Africa 8 – 17 September 2003.

### **5. Contribution of trend profiles to international reporting obligations**

Firstly, it is relevant to consider the extent to which international trend comparisons will be of value in meeting the various reporting obligations described. The only legislation that specifically requires trend information *per se* is the Convention on Migratory Species (CMS). New reporting guidelines for contracted parties, currently under preparation for this Convention, will request summarised information on population size, trends and distribution (if known), of species listed on CMS Appendix I. Apart from this, there are no clear reporting requirements for 'trend' comparisons. Similarly, there are no reporting obligations that require national comparisons to be made, owing to the political sensitivities of such a request. There are, however, obligations for reporting regularly on the state of natural resources.

At present the reporting requirements for most legislation relating to natural heritage are very general. For example, reporting guidelines for the Convention on Biological Diversity (CBD), requested Contracted parties to systematically report on Articles 5 to 26 of the Convention, via their Second National Report. This is achieved by answering a series of 377 questions, relating to the implementation of each of the articles of the Convention within their country. Frequently these questions are very subjective, requiring a yes or no answer, or an indication of the level of priority afforded to the implementation of the article, such as high, medium or low. Most of the questions require tick-box answers, with free text comment boxes available for the further elaboration and provision of comments about the implementation of the article, at the end of each question section.

Article 7 of the Convention, 'identification and monitoring', is the only article that specifically relates to monitoring. However, no detailed 'trend' data are requested from parties, rather countries are requested to indicate whether they have ecosystem or species monitoring programmes in place, are developing national biodiversity indicators (although detail about such indicators are elaborated) or are co-operating with other parties to demonstrate assessment and indicator methodologies.

Prior to 2001, reporting on the Convention at National level was even more subjective. All First National Reports on the Implementation of the CBD in the late 1990's were narratives, describing the state and pressures placed upon biodiversity



in each country and national and / or international action in response to such pressures. The lack of guidelines and direction given to Contracting Parties subsequently meant that the quality of First National Reports was extremely varied, ranging from extremely detailed reports comprising several volumes, supported by valuable quantitative data, to short 10-15 page reports providing very little detailed information on biodiversity. Steps were therefore taken to address this by the Secretariat of the Convention, through the development and provision of guidelines for submitting Second National Reports. The reporting process for this Convention is clearly evolving and becoming more precise, something that will inevitably continue. It is possible that Third National Reports, which will be submitted in four years time (2005), may require more detailed information on trends, but as yet this is unknown, and will of course require further development of national reporting guidelines.

At present the only mechanism where Contracting Parties may need to submit biodiversity trend data, is in response to a call for such information arising from the conference of the Parties (CoP). A decision may be made asking for the voluntary submission of such information from parties, although frequently there are no guidelines as to the quality or level of detail expected of this information.

The CBD is seen as one of the leaders among global conventions relating to natural resources, in terms of developing clear reporting guidelines relating to national implementation of the Convention. The Convention on Migratory Species (CMS) is now following in the steps of the CBD, with the development of clearer information guidelines. Many of the other key global wildlife and biodiversity conventions, such as the Ramsar Convention, World Heritage Convention and Convention on Trade in Endangered Species (CITES) are working together to harmonize their reporting processes, providing clearer direction regarding the information required to show that the obligation is being met. Clearer guidelines and improved information will provide a better opportunity to inform the global community about the state of the world's environment, pressures being placed upon it and responses to reduce or combat such pressures. However, progress has been limited to date.

Reporting obligations for aspects of the environment other than biodiversity, such as water quality, air quality and noise pollution, are more specific in their requirements. For example, the EU Bathing Water Directive 75/160/EEC requires detailed information to be provided on identified pollution variables (such as coliform contamination levels) in coastal and freshwater bathing waters, to be submitted annually.

Table 2. Provisional checklist summarizing opportunities for international trend comparisons to be made with Scotland (for further details on reporting obligations see supplementary spreadsheet).

Trend Profile Categories	Reporting obligations that require trend data or periodic data collected using a standard approach	Potential data sources	Potential for developing country comparisons (high, medium, low)
Birds	EU Bird Directive, CMS (bird species on appendix I)	CMS National Reports, Birdlife International (European Common Bird Census Database), National Bird NGOs	Medium. The central repository for EU bird information (Birdlife ECBC database), does not easily allow for the broad species groupings (seabirds, waders, farmland etc) to be determined, nor for information to be displayed on a country-by-country basis. Birdlife is currently working on the database to allow for this kind of query and data to be extracted; this may substantially improve the value of this data source.
Mammals	CMS (mammal species on listed on Appendix I)	CMS National Reports	Medium. CMS reporting requirements are in the process of change. Existing requirements invite Contracting Parties to submit trend information voluntarily. Data availability is rather ad hoc. New reporting guidelines (due to be accepted at COP 7 (September 2002), request parties to provide population estimates, trend and distribution data for CMS Appendix I species for which they are a range state. The potential for developing country comparisons in the future is therefore likely to be very high.



Migratory species	CMS Convention (Species on Appendix I), International Whale Convention	CMS Secretariat via country reports; IWC Secretariat	<p>Relatively low. Limited species population data available. Data could be obtained from national authorities or via national reports submitted to CMS Secretariat. Data quality is very variable between contracted parties to the convention owing to a lack of reporting guidelines. Population estimates should be used with care. Possible to use these data, but will take considerable time to extract (this source was not used in trend profiles presented here). Could in future look at some selected species (e.g. bats, marine species, some migratory bird species), where country is a range state. Whale data from annual reports such as number taken for commercial or aboriginal needs could give an indication of species stock status.</p>
Protected areas (national and international designations – IUCN categories, Ramsar, World Heritage sites)	World Heritage Convention (Periodic Reporting), Ramsar Convention (Ramsar Sites to be identified when initially accepted onto Ramsar List, also Periodic National Reports for CoP, EU Habitats Directive (list of sites - one time only),	UNESCO Paris - World Heritage Centre, UNEP-WCMC	<p>Relatively high. International and IUCN categories easy to obtain and track trends in area and number. This assessment will not assess quality or management effectiveness. National designations (such as SSSIs); problematic, require national protected area agency coordination. Habitat directive sites have only been assessed once - new assessments needed.</p>

Forest and woodland	No definitive legal requirement, although CBD may ask for periodic information on forest ecosystems. However FAO regularly assesses forest area, commercial timber production, trade and forest protection and area of forest in protected areas. Forest Health (EU Assessment and Monitoring of Air Pollution Effects on Forests)	FAO, national inventories, UNEP-WCMC  International Co-operation Programme on Assessment and Monitoring of Air Pollution Effects on Forests <a href="http://www.icp-forests.org/">http://www.icp-forests.org/</a> , the forest foliar co-ordinating centre ( <a href="http://fbva.forvie.ac.at/600/1026.html">http://fbva.forvie.ac.at/600/1026.html</a> ) and national forest service inventories	Relatively high. Data available for 1970s, 1980s until 1995 via FAO forest statistics database, more recent data available via FAO's periodic forest assessment publications (FAO 2001). Data available for most of the world. The value of these data for trend profiling is reduced by changes in forest definition over time and variability in national reporting. National inventories with time series data are more difficult to locate. Medium. Time series data are just starting to become available, via forest foliar coordinating centre. Data must be formally requested; data quality unknown, but has potential.
Farmland / Agriculture	No definitive legal requirement, although CBD may ask for periodic information on agricultural ecosystems. However FAO regularly assesses global land cover area (by agricultural type e.g. arable area, permanent pasture) and has time series data available via a publicly accessible database. EU countries also supply information through the annual structural farm survey. Many EU countries also have national agricultural censuses.	FAO land cover database, OECD/Eurostat, National Farm Censuses	High. Time series data for area of agricultural land across Europe and most of the world relatively easy to obtain. Within Europe also numbers / area (hectares) that are held in agri-environment schemes (countryside stewardship, environmentally sensitive areas, organic aid scheme, arable stewardship schemes), in response to EU Agri-environmental Regulation 2078/92 and Regulation 1257 / 1999 on Rural Development. However, problems include lack of consistency between FAO reports and reports to the EU. Also variation in land use classifications hinders integration of data from different sources.



Freshwaters	<p>No international global convention on freshwaters, although many EU directives requesting regular reporting on freshwater quality (inputs into rivers, lakes etc, BOD levels), including inland bathing waters, nitrates directive, freshwater fish directive, and in future the Framework Water Directive. The Ramsar Convention (wetlands) requires site and periodic national reports (for the COP), allowing for the identification of globally significant protected wetlands and associated freshwater ecosystems to be identified.</p>	<p>National reports submitted for some EU Directives (e.g. Bathing water Quality), EEA WaterNet database may provide data in coming months, Eurostat and OECD questionnaire; critical load exceedance data available from RIVM</p>	<p>Medium. Variable data available across EU, addressing different freshwater issues. Some species inventories in some EU countries, but very few over time, information often one-time only. The exception may be birds associated with freshwaters. (For difficulties see bird entry). Availability of recreational fish catch data in some countries could be used to assess fish stock status. Monitoring of selective pollutants, BOD levels into freshwater rivers / lakes in Europe periodically reported. Water abstraction data available from OECD / Eurostat etc. Critical load exceedance (acidification) maps available from European Topic Centre.</p>
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Coastal and marine	Several conventions and EU Directives including UNCLOS, OSPAR, EU Bathing waters Directive require regular reporting on fish stocks and hazardous pollutants into marine ecosystem.	ICES, FAO (Fish stat), National agencies in EU and EU Directorates for fisheries data. OSPAR for pollutants into coastal waters etc, also EEA and OECD/Eurostat.	High for marine fish data - catch data available from sources identified, sometimes including species breakdown. Fish stock levels less easy to determine on a country-by-country basis as data are often assessed by Marine area (N. Atlantic, Biscay, North Sea etc). Pollutants are being regularly monitored (now) by OSPAR, but often are for selective hazardous substances only.
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<p>Pollution (air and water impacts)</p>	<p>Air Emissions - UNFCCC (annual emissions data), CLRTD (annual data). Water pollution is covered by OSPAR and several EU water directives (see above)</p>	<p>UNFCCC greenhouse gas database, UNECE air quality database, AIRBASE (European Environment Agency), National Reports for many EU countries. OSPAR for pollutants into coastal waters, also EEA and OECD/Eurostat. Critical load exceedence data available from RIVM.</p>	<p>High. Air pollutant emissions (Carbon dioxide, Sulphur dioxide, nitrogen oxides, methane, VOCs, Ozone) have been compiled annually for much of Europe and the World since 1990. For water pollution see earlier entries. Maps of critical load exceedence now available for a number of ecosystems, with associated trends.</p>
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## 6. Synthesis

The process of compiling the trend profiles presented in this report, and of reviewing reporting obligations, highlighted a number of issues relating to future development of trend profiles, and their potential value. These issues are discussed below according to a series of questions.

### 6.1. *What are the constraints to developing trend profiles?*

Table 3 summarizes the constraints in developing the fifteen trend profiles and opportunities for their further development.

One of the principal constraints in producing environmental trend profiles is the availability of suitable data. In some cases there may be interest in a particular issue, but only anecdotal information or data from a few localities is available. For some topics data are only available for the driving forces or pressures on the environmental issue, for example air pollutant emissions affecting natural habitats. A related constraint is the use of proxy measures because of a lack of data directly measuring the species or other element of natural heritage of interest: for example, catch data of salmon and culls of deer.

The problem of comparing data sets derived from different assessment methods is particularly constraining when attempting to assess changes over time or space. Analysis of trends in the state of natural heritage requires information to have been collected in a systematic manner that has been consistently applied over time; in practice, these criteria are rarely met. Comparison of trend data between countries is hindered by the additional problem that assessment methods are unlikely to be consistent between countries, particularly as such assessments tend to be undertaken in response to national priorities rather than international obligations. Different national criteria and scales for the measurement of water quality is an example of this problem. As a result, there are limited cases where precise, quantitative information on an aspect of natural heritage will be available of sufficient quality or quantity to enable meaningful comparisons between countries over time.

For some of the trend profiles selected, the subject contains many elements that could each form separate profiles. For example, air pollution is a complex subject with at least four major components (nitrates, sulphur emissions, VOCs, ozone), each of which impact on many aspects of natural heritage. The scientific reasoning and modeling behind concepts such as critical exceedance levels also needs careful explanation to a non-scientific audience.

The limitation of available data has also narrowed the choice of environmental trend profiles developed, with no profiles on invertebrates or plants selected in this project. Data are most readily available where international monitoring and reporting bodies have been established, such as the European Birds Database and the International Council for the Exploration of the Sea. For birds and mammals at least, the UK and western Europe have been extensively surveyed for most species and reliable trend data are available. For eastern Europe the availability of data is much more variable and time series are more difficult to compile. For the Nordic region, less data are available for Norway than Sweden and Finland because Norway is not a member of the EU.





**Table 3. Constraints and Opportunities in the Development of the environmental trend profiles**

Trend	Constraints	Opportunities for Development
Air pollution & critical exceedance levels	<p>Air pollution is a complex subject with at least 4 major components (nitrates, sulphur emissions, VOCs, ozone) with impacts on many aspects of natural heritage, and so is difficult to present in one profile.</p> <p>The concepts, methods and results of critical exceedance modelling require careful explanation to a non-technical audience.</p> <p>The effects and modelling of ground-level ozone on natural ecosystems are not reliably established.</p>	<p>Good data sets are being developed for all of Europe, driven by international agreements to reduce emissions of pollutants.</p> <p>It may be more appropriate to produce separate trend profiles on acidification and eutrophication of terrestrial and freshwater habitats, rather than on the pressure of emissions. This could be done with NEG-TAP in the UK and RIVM for the rest of Europe.</p>
Arable/ forest/ pasture land cover	<p>The principal data set for land cover for all European countries is the FAOSTAT database, also available through EUROSTAT. Data are compiled from national reports and cover very broad categories such as pasture and forest. These categories are open to differing interpretations and mask many of the land cover features of interest to a natural heritage perspective, such as types of woodland and grassland, moorland, mire, etc.</p> <p>Data on the driving forces behind land cover change is not available across Europe, although general analyses of trends in agricultural systems have been made.</p>	<p>Any future updates of the CORINE land cover data from satellite imagery will allow Europe-wide analyses of land cover change.</p> <p>It may be more appropriate to focus on agricultural land use and trends in farming systems eg. arable, livestock or mixed farming, farm and field size, livestock &amp; arable production, intensification, abandonment. If this were coordinated with the proposals for agri-environmental indicators to the EU in Wascher (2000) and proposed by the EEA it would provide a basis for comparison with the rest of Europe.</p>
Water Quality – rivers & streams	<p>Good data exists on nitrate and phosphorous levels in rivers (less so for lakes) across the EU, compiled by the EEA. Different criteria and measurements for quality of water limit comparisons between countries.</p> <p>Water quality can have many components, such as the levels of pollutants and their impacts such as acidification, eutrophication, populations of indicator species, and degree of modification of natural flow regimes, etc.</p>	<p>Separate trend profiles could be developed for water eutrophication and ecological criteria, including indicator species, as proposed by the EEA.</p> <p>A Europe-wide system for monitoring the ecological quality of rivers using macro-invertebrates is being developed.</p>



Trend	Constraints	Opportunities for Development
Forest cover and native forest	<p>The principal data set for forest cover for all European countries is the FAOSTAT database and the FAO Forest Resource Assessments (FRA). This is compiled from national reports and has some limitations for comparisons between countries due to differing definitions of forest, etc. The latest FRA includes information on naturalness of forests, but no trend data yet exist.</p> <p>The UK has a Biodiversity Action Plan for native forests, but most other European countries appear not to have such plans.</p>	<p>Any future updates of the CORINE land cover data from satellite imagery will allow Europe-wide analyses of land and forest cover change.</p>
Dotterel	<p>Most population estimates for the dotterel are imprecise and there is very little information on population trends. The dotterel is highly itinerant, with birds mixing between populations. Short-term population changes may therefore be due to shifts in numbers between populations rather than external pressures. It is therefore difficult to discern differences between, and attribute causes to, trends in different countries. A further complication is that while there is good information for some countries, including Scotland, there is a lack of detailed information on populations and pressures in others.</p> <p>The main data source is EBCC and SNH.</p>	<p>Population Estimates and Trends for EBCC is currently being updated.</p> <p>The dotterel was selected as a potential montane habitat indicator, but little information was available on this aspect. Other species may be more appropriate or added to this profile as indicators of the state of the montane environment.</p>
Wintering waders	<p>Good data are available for Scotland and the UK through SNH and the JNCC/BTO/ RSPB/ WWT Wetland Bird Survey. For the rest of Europe data are available from Wetlands International.</p> <p>The selection of which wader species to include in the profile was based on wintering abundance in SNH trends 2001. Most wader species are geographically widespread and highly mobile, so changes in numbers may reflect changes in range and the identification of national populations is problematic. Wader species differ ecologically and so population trends may reflect a variety of pressures.</p>	<p>An atlas of wader populations in Africa and western Eurasia is in preparation and will provide population trend data.</p>

Trend	Constraints	Opportunities for Development
<p>Wintering geese</p>	<p>Good population trend data is available from Wetlands International and SNH/ WeBS.</p> <p>Data were available for total global populations of each species, which masks trends in races and regional populations. Individual population data was available from Madsen et al., (1999).</p>	<p>Increasing wintering goose populations are linked to changes in agriculture, which could be examined in more detail.</p>
<p>Farmland birds</p>	<p>The BirdLife/EBCC European Bird Database (EBD) was the principal source for European data. In some cases population estimates and trends are based upon accurate, large-scale surveys, whereas in others the estimates are based on more qualitative information. This results in a varying degree of error in population estimates.</p> <p>The 8 farmland bird species selected for comparison between Scotland and Europe were those having declined in range in Scotland and predominantly associated with farmland across Europe.</p> <p>Range-size changes in Scotland were compared with changes in the rest of the UK using data based on a 10x10 km grid, however the EBD is based on a 50x50 km atlas. The EBD places each European country in one of several trend categories depending on the size and direction of the change in range or population size. This made it difficult to directly compare range-size trends in Scotland, which were given as percentages, with the categorical range-size trend information for the rest of Europe.</p> <p>Breeding bird population data for the UK is at a much higher resolution than is available for the rest of Europe through the EBD.</p>	<p>Currently, no pan-European indicator of farmland birds exists, but such a project is in its very early stages. Similarly, while there is an index of farmland bird populations at the UK level regional indices for Scotland, England and Wales are currently being devised and will allow future comparisons between regions.</p> <p>The trend profile could be developed for a wider range of species, including those with increasing or stable populations.</p>



Trend	Constraints	Opportunities for Development
Marine fish catches	<p>Reports by the ICES Advisory Committee on Fishery Management provided information on the status and trends of individual fish stocks, e.g. cod, in each sea or fishing area. This did not allow comparisons between Scotland and other countries.</p> <p>Long-term data are available from ICES and FAO on landings by country, but these are governed mainly by fishing effort and quota restrictions. Furthermore, a substantial amount of fish biomass is discarded under the terms of the Common Fisheries Policy (discards do not survive and artificially increase food availability for some seabird populations, which have expanded). Discards have not been represented in international statistics.</p> <p>The trend profile mostly considers groupings of fish, eg. demersal, pelagic, rather than individual species.</p>	<p>Profiles could be developed for individual marine fish species of interest, e.g. cod.</p> <p>An analysis of catch per unit effort between countries could potentially be developed with ICES.</p>
Seals – Harbour & Grey	<p>The principal data source was an ICES Marine Mammals Working Group report, which contained up-to-date information on estimated population sizes and trends for Europe. The report presented data on the British population of grey seals from 1998 onwards, which limits comparisons with long-term trends in other populations. Other sources of information for British populations are the Sea Mammal Research Unit and the Department for Environment, Food and Rural Affairs.</p> <p>Information on the distribution and status of populations at the global scale was found in the IUCN Seal Action Plan. There are no reliable estimates of trends in the northwest Atlantic grey seal stock.</p>	<p>The Wadden Sea Secretariat conducts surveys of seals and may be a source of information.</p>
European Otter	<p>Many countries have not carried out standardised periodic surveys as in the UK and to some extent Scandinavia. Some information is anecdotal, some from questionnaires and some from hunting bags.</p>	<p>The IUCN/SSC Otter Specialist Group has plans to implement more standardised surveys and these are likely to document recent increases.</p>

Trend	Constraints	Opportunities for Development
Red & Roe Deer	Gill (1990) was used for European data on numbers and trends in both species. The Deer Commission for Scotland reports cull levels and population estimates for the whole of Scotland. No comparable data exists for England and Wales.	The British Deer Society has plans to create a population database covering Britain and Europe, which would allow a comparison with Gill (1990).
Salmon	<p>Data and analyses were principally obtained from the Report of the Working Group on North Atlantic Salmon (a sub-group of the ICES Advisory Committee on Fishery Management). The ICES report contains comprehensive information on stock status for all relevant countries, and is the most complete record of international data for Atlantic salmon. The ICES estimates of national stock levels are based upon mathematical manipulations of catch data. Caution must be exercised in their use as such estimates, while based upon best available data, are subject to more uncertainty and error than direct counts of smolts and returning fish.</p> <p>Information was also obtained from other international fisheries organisations (FAO, NASCO) and national fisheries research institutions in Scotland, England and Canada.</p>	The trend could be expanded to include data on the pressures affecting salmon, such as different fishing methods, and the quality of rivers. This could be represented on a map of river systems, as in Figure 140 in Hallanaro and Pylväinen (2002).
Capercaillie	<p>The main sources of information on status and threats were the IUCN Status Survey and Action Plan and the JNCC Special Protection Areas report. BirdLife International also provided European breeding population data. Regular monitoring occurs in many European countries, and therefore reliable trend information is available. However, population estimates are often based upon counts at leks, which may be biased towards larger leks.</p>	This profile could be linked to data on native pine woodland in Scotland and other species typical of this habitat, e.g. pine marten.
Corncrake	Good population data exists for western Europe through the European Bird Database, including regular Scottish surveys. Less data are available for eastern Europe	As part of the European Corncrake Species Action Plan the RSPB has funded corncrake population surveys in several Central and Eastern European countries to bridge information gaps.





6.2. What are the prospects for future development of trend profiles?

The profiles which are most straightforward to develop are those for which data are regularly being gathered and made available by an international body, such as the European Bird Census Data or by the European Environment Agency. These data gathering processes are often driven by international agreements and mandates, such as pollution control or to meet European Union directives. Thus it will be more straightforward to obtain comparable data if trends are in alignment with these needs. This process is being led by the European Environment Agency, which has proposed a core set of some 400 indicators. A summary of the relevance of the fifteen trend profiles produced in this report to these indicators is presented in Table 4. The need to maintain disaggregated data for Scotland and the UK in this process is an important one, in order for comparisons to be made.

In some cases trend data can be obtained from groups with specialist interests. One example is the World Conservation Union (IUCN) Species Survival Groups. The ease and sustainability of developing comparative trend profiles can be increased if the profiles are developed in collaboration with these specialist groups. If such groups see how their information is being utilised to support decision-making it can encourage the gathering and sharing of data suitable for trend analyses.

The trend profiles selected in this report represent pressures on the environment, such as air pollutants, and different aspects of the state of the environment, such as water quality and species populations. The trends could be more consistently organised and presented within the widely used Driving Forces – Pressures – State – Impacts – Response (DPSIR) framework. Wascher (2000) provides good examples of how this has been developed for agri-environmental indicators.

One of the challenges in the development of the international trend profiles is the requirement for comparable data across many countries and regions which allows for the identification of trends, rather than status

**Table 4.** Proposed European Environment Agency Core Set of Indicators relevant to SNH international comparison of trends profiles.

	ENVIRONMENTAL ISSUE and indicator	Relevant SNH Trend profiles	Relevance of SNH profile to the indicator
	AIR POLLUTION AND EMISSIONS		
AP1	Emissions acidifying pollutants (total & by sector)	Air pollution and critical exceedance levels	Medium (pressure indicator)
AP2	Percentage Area Exceedance Critical Loads Total acidity	Air pollution and critical exceedance levels	High (impact indicator)
AP3	Effectiveness policy response NOx		
AP4	Effectiveness policy response CO2, NOx and SO2 (electricity generation)		
AP15	Exposure of ozone to crops/forests	Air pollution and critical exceedance levels	High (pressure indicator)
AP16	Emissions NH3 (total & by sector)	Air pollution and critical exceedance levels	Low (pressure indicator)
AP17	Emissions NMVOC (total & by sector)	Air pollution and critical exceedance levels	Low (pressure indicator)
AP18	Emissions NOx (total & by sector)	Air pollution and critical exceedance levels	Low (pressure indicator)



AP19	Emissions ozone precursors(total & by sector)	Air pollution and critical exceedance levels	Low (pressure indicator)
AP20	Emissions SO2 (total & by sector)	Air pollution and critical exceedance levels	Low (pressure indicator)
AP21	Emissions Heavy metals and POPs (total & by sector)	Air pollution and critical exceedance levels	Low (pressure indicator)
AP22	Urban emissions NOx, VOC, PM, SO2, NO2	Air pollution and critical exceedance levels	Low (pressure indicator)
AP23	Percentage Area Exceedance Critical Loads nutrient Nitrogen	Air pollution and critical exceedance levels	High (impact indicator)
	<b>BIODIVERSITY</b>		
BDIV1	European Species Richness		
BDIV2	European specific responsibility for threatened species		
BDIV3	European Habitat Diversity		
BDIV4	Trends of species in relation to human activities	Dotterel Wintering waders Wintering geese Farmland birds Marine fish catches Seals – grey and harbour European otter Red and Roe Deer Salmon Capercaillie Corncrake	High (state indicators)
BDIV5	Human use in and habitats		
BDIV6	Trends in introduced species		
BDIV7	European Concern for Conservation of Species		
BDIV8	Concern for Conservation of Sites in Europe		
BDIV9	Species Biodiversity in designated areas		
BDIV10	Habitats Biodiversity in designated areas	Water Quality Forests and native forest	Medium (state indicator) – trends not designed for th indicator
BDIV11	Human pressure on designated areas		
BDIV12	Species and agro-ecosystems	Wintering geese Farmland birds Red and Roe Deer Corncrake	High (state indicators)
BDIV13	High nature value ecosystem	Water Quality Forest cover and native forest Dotterel Wintering waders Wintering geese Farmland birds Seals – grey and harbour European otter Red and Roe Deer Salmon Capercaillie Corncrake	High (state indicators of ecosystems & important species)
BDIV14	Threatened species using agro-ecosystems	Farmland birds	High (state

		Wintering geese Corncrake	indicators)
BDIV15	Implementation of agri-environmental measures	Arable/ forest/ pasture land cover – could be developed to respond to this indicator	Medium (pressure indicator?)
BDIV16	Tree species composition	Forest cover and native forest – could include data on tree species	Medium (state indicator)
BDIV17	Deadwood		
BDIV18	Regeneration	Forest cover and native forest – if Europe-wide data is available	Low (state indicator)
BDIV19	Landscape pattern	Arable/ forest/ pasture land cover – could be developed to respond to this indicator	Low (pressure? indicator?)
BDIV20	Threatened species	Dotterel Wintering geese Farmland birds European otter Salmon Capercaillie Corncrake	High (state indicators)
BDIV21	Naturalness	Water Quality Forest cover and native forest Arable/ forest/ pasture land cover - data may be developed for this	Low (pressure? indicator)
BDIV22	Introduced species in forest	Forest cover and native forest	Low (pressure indicator)
BDIV23	Genetic resources		
BDIV24	Protected forests	Forest cover and native forest – data available	Medium (response indicator)
BDIV25	Forest in designated areas	Forest cover and native forest – data available	Medium (response indicator)
	<b>TERRESTRIAL</b>		
TE006	Farmland abandonment	Arable/ forest/ pasture land cover – could include this data	Low (pressure indicator)
TE014	Areas under agri-environmental support	Arable/ forest/ pasture land cover – could include this data	Low (response indicator)
TE023	Average daily distance covered by urban citizens		
TE049	Dominant pressure from land use	Arable/ forest/ pasture land cover – could include this data	Low (pressure indicator)
TE053	Erosion risks of soils		
TE065	Forest fires	Forest cover and native forest – could include this	Low (pressure indicator)
TE066	Fragmentation of ecosystems and habitats	Arable/ forest/ pasture land cover	Low (pressure indicator)



		Forest cover and native forest – data could be generated	
TE070	High nature value farming areas		
TE084	Land cover changes	Arable/ forest/ pasture land cover	High (pressure and state indicator)
TE085	Land cover changes in the surroundings of Protected Areas	Arable/ forest/ pasture land cover – data could be generated	Low (pressure indicator)
TE086	Impacts of land use on landscape diversity		
TE099	Nitrogen surplus by river basins	River water quality	Low (pressure indicator)
TE108	Loss of organic matter in top soils		
	<b>WATER - EUTROPHICATION</b>		
WEU2	Nutrients in rivers	River water quality	High (pressure indicator)
WEU3	Phosphorus in lakes		
WEU4	Nutrients in coastal waters		
WEU5	Chemical organic pollution indicators (BOD, ammonium & oxygen) in rivers	River water quality (could be expanded to include this)	High (pressure indicator)
WEU6	(D) Sources of nitrogen and phosphorus		
WEU7	Loads (riverine and direct) of nutrients to coastal waters		
WEU8	Atmospheric deposition of nitrogen to marine and coastal waters		
WEU9	Nutrient balance and surplus for agricultural soils		
WEU10	Emissions of organic matter		
WEU11	Emissions of nutrients from UWWT plants		
WEU12	(M) Emissions of organic matter and nutrients from industry		
WEU15	Bathing water quality	River water quality – could include this	Low (state? indicator)
WEU16	Eutrophication indicators (chlorophyll, Secchi depth, area with oxygen depletion) in lakes	River water quality (could be expanded to include this)	High (pressure indicator)
WEU17	(D) Indicators of the biological quality elements for lakes under the WFD		
WEU18	Chlorophyll in transitional, coastal and marine waters		
WEU19	Phytoplankton in transitional and coastal waters		
WEU20	(D) Frequency of low bottom oxygen in deep layers of marine waters		
	<b>WATER- ECOLOGY</b>		
WEC1	Benthic invertebrate fauna in transitional and coastal waters		
WEC2	Macrophytes and macroalgae in transitional and coastal waters		
WEC3	Habitats in transitional, coastal and marine waters		
WEC4	Classification of transitional and coastal waters		

WEC5	River classifications	River water quality (could be expanded to include this)	Medium (status indicator)
WEC6	Biological quality elements for lakes	River water quality (could be expanded to include this)	Medium (status indicator)
WEC7	Introduced species in marine and coastal waters		
WEC8	Introduced species in fresh surface waters		
WEC9	Implementation of EU Water Policies		
WEC10	Integrated Coastal Zone Management		
	SECTORS		
	AGRICULTURE		
AGRI1	Environmental targets		
AGRI2	Energy consumption		
AGRI3	Surface nutrient balance		
AGRI4	Greenhouse gas emissions		
AGRI5	Pesticide soil contamination		
AGRI6	Water contamination		
AGRI7	Groundwater abstraction		
AGRI8	Soil erosion		
AGRI9	Genetic diversity		
AGRI1 0	Species richness	Farmland birds (selected species)	Medium (state indicator)
AGRI1 1	Soil quality		
AGRI1 2	Nitrates/pesticides in water		
AGRI1 3	Ground water levels		
AGRI1 4	Landscape state	Arable/ forest/ pasture land cover	Low (pressure/ state indicator)
AGRI1 5	Habitat and biodiversity		
AGRI1 6	YIR02AG14 Bird richness in relation to farming intensity	Farmland birds (selected species)	High (state indicator)
AGRI1 7	Water consumption		
AGRI1 8	High nature value areas		
AGRI1 9	Production of renewable energy sources		
AGRI2 0	Share of agriculture greenhouse gas emissions, nitrate contamination and water use		
AGRI2 1	YIR99AG06 Agricultural eco-efficiency		
AGRI2 2	Organic farming: area		
AGRI2 3	Fertiliser consumption		
AGRI2 4	Pesticide consumption		
AGRI2 5	Land use: topological change	Arable/ forest/ pasture land cover	Low (pressure indicator)



AGRI2 6	Land use: Cropping/livestock patterns	Arable/ forest/ pasture land cover	Low (pressure indicator)
AGRI2 7	Diversification	Arable/ forest/ pasture land cover	Low (pressure indicator)
AGRI2 8	Marginalisation	Arable/ forest/ pasture land cover	Low (pressure indicator)
AGRI2 9	Land cover change	Arable/ forest/ pasture land cover	High (pressure indicator)
AGRI3 0	Agricultural and global diversity		
AGRI3 1	% area planted with GMO crops		
AGRI3 2	Area benefiting from agri-environment support		
AGRI3 3	Organic farming: prices and income		
AGRI3 4	YIR01AG09 Structure of Common Agricultural Policy support		
AGRI3 5	YIR02AG15 Structure of CAP Rural Development Expenditure 2000-2006		
AGRI3 6	YIR02AG16 Environmental Components of EU Rural Development Programmes		
AGRI3 7	Good farming practices		
AGRI3 8	Protected area		
AGRI3 9	Holders' training levels		
AGRI4 0	Management practices		
AGRI4 1	Intensification/extensification		
AGRI4 2	YIR01AG12 Environmental measures taken by farmers		
AGRI4 3	YIR02AG13 Nitrate Directive Implementation		
	ENERGY		
EE5	Total sulphur dioxide emissions	Air pollution	Medium ( pressure indicator)
EE6	Total emissions of nitrogen oxides	Air pollution	Medium ( pressure indicator)
	FISHERIES		
FISH1	6. Status of marine fish stocks (new title)	Marine fish catches	High (pressure and state indicator)
FISH2	15. Metrics of community structure		
FISH3	16. Fish stock characteristics	Marine fish catches	High (pressure and state indicator)
FISH4	18. Spawning stock biomass		
FISH5	11. Aquaculture Production per coastal area		
FISH6	19. Physical damage to habitats and species		
FISH7	20. Discards		
FISH8	21. By-catch		

FISH9	12. Production of non indigenous species new: Indicator on introduction of alien species by mode of introduction (aquaculture) from water core set?		
FISH10	13. Quality of effluent water		
FISH11	14. Biodiversity indicators near farms compared with away from farms		
FISH12	22. Quality of fish for human consumption (Fisheries & Aquaculture)		
FISH13	4. Gear loss		
FISH14	5. Fishing mortality		
FISH15	7. Fishing capacity of fleets (new title)		
FISH16	8. Fishing effort		
FISH17	9. Maximum sustainable yield/fishing effort		
FISH18	17. Catch per Unit Effort		
FISH18	new: indicator on ecoefficiency of aquaculture? B		
FISH19	1. Fish consumption per capita		
FISH20	10. Catches by major species and areas	Marine fish catches	High (pressure and state indicator)
FISH21	2. Average wage (Fisheries & Aquaculture)/average national wage		
FISH22	3. Market demand (F & A) or Price - First sale value/cost		
FISH23	25. Fisheries restructuring		
FISH24	23. Quota management		
FISH25	24. Zone management		
FISH26	26. Percentage of fisheries reflecting environmental integration		
FISH27	27. Percentage of aquaculture complying to Fish Farms Code of Conduct		

### 6.3. How can trend profiles be used to assist with meeting reporting obligations?

This study has shown that the volume of international and regional environmental and biodiversity conservation legislation has significantly increased over the last 20 years. Previous sections have highlighted that all of these pieces of legislation have some form of reporting obligation, however the frequency, approach and degree of detail for reporting vary significantly. Additionally most biodiversity conservation conventions, agreements and regulations rely on the good-will of Contracted Parties to submit national reports. Countries are encouraged and requested to submit reports, however if they fail to do so they face no penalty.

The review of reporting obligations has confirmed that the majority of biodiversity related conventions have, to date, generally requested Contracted Parties to report on their compliance with legislation, such as their means and success in the implementation of policies, strategies and action plans. There has been little attention on regular quantitative reporting on the status of biota that the Convention represents. European Directives and Regulations have had a similar focus, although legislation relating to air and water pollution has tended to buck this trend, often



requiring detailed monitoring of water and air quality and levels of specific emissions and chemical elements to be recorded.

Only over the last few years have many international Conventions, associated agreements and regional Directives and Regulations begun to develop improved and more focused reporting guidelines that may incorporate the need for detailed or quantitative biodiversity data or trends. Chief amongst these is the Convention on Migratory Species (CMS). As described in earlier sections of this report, at present it is likely to be the Convention that provides the best opportunity for trend profiles to assist with meeting reporting obligations. At present it is the only Convention that requests trend information with regard to species listed on its appendices per se. This is only a very recent development that is still awaiting full approval by all Contracting Parties. This approval should be given in mid-September 2002 at the CMS Conference of Parties (COP).

The Convention on Biodiversity (CBD) potentially has scope for being supported by biodiversity trend information, however only after reporting needs and guidelines have been further refined. National reporting currently focuses on the implementation of Article 6 *General Measures for Conservation and Sustainable Use*. However, in recent years Contracting Parties have been invited, as a result of *Decisions* made at the Conference of the Parties (CoP), to voluntarily submit information on the status and trends of selected ecosystems and associated components, such as forests, inland waters, dry and sub-humid lands as well as protected areas. This information is being used to guide and further refine the Convention's Thematic Programmes of Work. Trend profiles could clearly be of value in this context.

Article 7 of the Convention (Identification and Monitoring) requests each Contracting Party to identify and monitor components of biological diversity important for its conservation and sustainable use. At present no guidelines have been developed and accepted by Contracting Parties for the incorporation of such information into national reports, although work is being undertaken on identifying key biodiversity indicators that could be used to support this need.

At the regional level, the recent acceptance of the European Water Framework Directive (2000/60/EC) is likely to offer the best opportunity for the use of trend profiles to meet or assist with reporting obligations. Acting as an umbrella for all existing water legislation, the Directive establishes a strategic framework for managing the water environment. It establishes a common approach to protecting and setting environmental objectives for all groundwaters and surface waters (defined as rivers, canals, lakes, reservoirs, estuaries and coastal waters up to one mile from the shore) within the European Community. The Directive will be transposed into UK legislation by December 2003.

#### 6.4. *Might modular approaches to reporting be feasible?*

Matching reporting obligations on natural heritage with the information sources that exist presents a significant challenge. As noted earlier, information on natural heritage tends not to be collected systematically in response to specific reporting obligations. Instead, information is generally collected in response to national legislation, or is driven by the research agenda of the participating organizations. As a result, the process of reporting on the state of the environment generally requires collation, analysis and presentation of data obtained from a wide variety of sources, which have been collected using a diverse array of sampling strategies and methods.

One approach that could assist in reducing the reporting burden, is some form of *modular reporting*. This concept is based on the belief that the information required for the implementation of Conventions, and reporting on that implementation, can be defined as a series of discrete information packages or modules, which can be combined to respond to the reporting requirements of any given convention. The primary objective of a modular approach is to eliminate duplicate reporting and reduce the effort required for parties to prepare and submit specific reports to the conventions. It could also potentially:

- Improve the quality, availability and usefulness of information for national purposes
- Encourage integrated national approaches and improved information access and sharing between institutions within party countries
- Facilitate links to the conventions and regional bodies, and improve information sharing between neighbouring countries

Analysis of Scotland's reporting obligations can be summarized under the following groups:

- Species (threatened animals and birds, migratory animal and bird species, whales, bats, cetaceans)
- Habitats (wetlands, natural and semi-natural habitats)
- Protected areas (protection of habitat types)
- Freshwater (water quality)
- Marine environment (water quality, status of fish stocks)
- Atmospheric emissions (carbon dioxide, nitrogen oxides, sulphur dioxide, methane, VOCs)
- Climate change (atmospheric emissions that influence climate change)

These groups of reporting obligations could be defined as 'thematic modules', for which trend profiles could potentially be developed. However, for a fully modular approach to reporting to be implemented, attention would need to be given to the development of an appropriate *information system*. Many large-scale assessments use information systems to store and distribute "metadata" about the data used in the assessment. "Metadata" here refers to information about the origin, content, and reliability of a data source. Linkages can be made between information systems by achieving some form of interoperability based on common data and metadata standards. Recent trends in development of information systems have included the widespread adoption of internet portals (such as UNEP.Net), often supported by internet-based interactive map services. Such portals provide a further opportunity for linkage between data (e.g. through hyperlinking information resources between portals, integration of map layers from different sources). This form of data integration has been greatly facilitated by recent developments in software design and telecommunication infrastructure.

The development of integrated information systems involving different providers of environmental data could be of great value in facilitating the production of trend profiles. Ideally, the data would be made available in a relatively raw state, so they could be analysed and presented in different ways according to different reporting needs.



## 6.5. *Why profile environmental trends?*

Given that development of trend profiles will contribute relatively little to meeting international reporting obligations, it is pertinent to consider what value lies in the development of trend profiles.

The assessment of environmental trends is of key importance for the development and implementation of policies relating to the environment. Monitoring of the state of the environment is also essential for defining suitable approaches to land management. Information on environmental trends can be used to assess the impacts of current policies and management interventions, and therefore provides an indication of whether current approaches need to be modified, to ensure that the natural heritage is effectively conserved. Monitoring is therefore a central element of 'adaptive management' approaches (Margoluis and Salafsky 1998). The trends presented by Mackey et al. (2001) therefore provide a valuable resource for defining the need for future conservation action in Scotland, in terms of both policy and management responses.

However, the issue of relevance to this report is the comparison of such trends with those available for other countries, as described here in the trend profiles. What is the value of such international comparisons? Some possible uses of these comparisons are outlined below:

- *To define the scale of the trend.* Is the trend national, regional or global trend in scale? This information would be helpful in defining the appropriate policy response to any change detected. For example, the trends in land use change recorded in Scotland are similar to those occurring in other parts of Europe (Mackey et al. 2001); they may therefore be influenced by a common set of drivers at the regional scale (e.g. through policies of the European Community). Other trends, such as climate change, may be global in scale, and may therefore be most readily addressed by global policy forums such as the UNFCCC.
- *To provide early warning of emerging threats.* As illustrated by the trends documented here, the environment is changing rapidly, in response to many different pressures. Some of these pressures result in negative impacts on the natural heritage. The early detection of emerging threats to the environment is an issue of key importance to managers and policy makers, and this is an issue that could potentially be assisted by the development of trend profiles. For example, if an increase in the abundance of an invasive, exotic species was recorded in a particular country, then neighbouring countries might be alerted to possible future risks affecting them. Other threats for which early warning would be of particular value include outbreaks of pests or diseases, natural disasters or serious pollution events.
- *To identify best practice in detection and presentation of environmental trends.* One of the advantages of comparing trends with those produced in other countries is the potential for exchanging information on methods and lessons learned. For example, the European Environment Agency (EEA) regularly produces reports detailing environmental trends; these are made accessible over the internet and are disseminated in printed form in a number of different languages. In some thematic areas, technical papers have been produced by the EEA, which describe the assessment of environmental trends, the methods adopted and interpretation of the trends identified. The environmental agencies of many countries have developed internet-based information resources, but these



are very variable with regard to the detail and scope of content relating to environmental trends. Some present on-line databases, providing open access to primary data. Many countries are also in the process of developing their own indices for sustainable development, but these are rarely comparable between countries.

- *To identify data gaps.* Ideally, all environmental trends would be based on high quality data, collected according to a systematic and statistically sound sampling protocol. Unfortunately, as indicated earlier, there are relatively few environmental monitoring programmes which meet this requirement.

Ultimately, for environmental trends to be of value to policy makers, information is required not only on the extent of change occurring, but on the causes of such change. At present, the profiles presented here include little information regarding the underlying causes of the trends detected, yet such information is of critical importance to defining an appropriate policy response. As reported by Mackey et al. (2001), many elements of the natural heritage of Scotland appear to be in decline. Why are so many widespread species of birds currently declining? Why have so many rare and endemic plant species declined in recent years? Such questions can only be addressed through appropriate research. The development of trend profiles could therefore assist in defining priorities for research, so that the causes of environmental change can be effectively identified.

#### *6.6 Practical steps for the development of trends in international reporting obligations*

In terms of practical action there are two levels at which an agency with reporting obligations for natural heritage and the environment can operate – nationally and internationally. The development of trend profiles is an extremely useful approach in terms of meeting information needs at a national level and answering pressure, state and response questions relating to natural heritage. These may include what is the state of national or individual natural heritage components, where are the pressures, what changes and responses are taking place as a result of these pressures and how do we begin address these? It is likely to be easier for an agency to take practical steps at the national scale to develop trend profiles and to then promote and develop these through the international Conventions and reporting mechanisms to which they are party. The following section makes some suggestions in this context.

Agencies which function as the National Focal Point for the CBD, or work with the national Focal Points, are strongly encouraged to strengthen collaborations with other government agencies responsible for biodiversity and natural heritage in developing biodiversity trend information. Opportunities for this are when countries are requested or invited to submit biodiversity trend information by the Conference of Parties, particularly in relation to the Convention's main thematic programmes of work (marine and coastal biodiversity, forest biodiversity, biodiversity of inland waters, agricultural biodiversity), as well as cross-cutting issues with biodiversity and natural heritage relevance (alien species, and biodiversity indicators).

Major biodiversity themes to be addressed at the next Conference of the Parties (COP 7 - Malaysia, March 2004), include mountain ecosystems, protected areas, transfer of technology and technology cooperation. Following COP 6 (The Hague, April 2002), Contracting Parties have been invited to submit thematic reports on mountain ecosystems, protected areas or areas where special measures need to be taken to conserve biological diversity. These reports should be submitted to the CBD

Secretariat on 31 October 2002 (mountain ecosystems) and 30 March 2003 (protected areas). The format for the reports has already been developed and is currently available via the CBD website. Within the reports there is an opportunity for the submission of case studies. Agencies with experience in the development of trend profiles may be able to provide valuable input into any studies or reports submitted by their countries.

In addition, agencies with experience in trend profiles could aim to encourage their CBD National Focal Point (during SBSSTA and COP meetings), to continue to negotiate and encourage other Contracting Parties to support the refinement of reporting guidelines requesting information monitoring biodiversity change and trends. This would greatly assist with the process of assessing the status of global biodiversity.

Specific biodiversity indicators and implementation targets have not yet been specified by the COP of the CBD. However at the COP 6 of the CBD in March 2002 a resolution was made to put in place measures to halt biodiversity loss at global, regional and national levels by 2010. The baseline measurements of biodiversity and the indicators for measuring change have not been determined. However it is suggested that national agencies responsible for natural heritage continue to work closely with other government agencies in the development of biodiversity indicators that could be of value to the CBD. This work must be communicated at the highest level (i.e. through the National Focal Point for the CBD) so that at the political level, these agencies and their partners can take the lead in showing the global community what can be done.

The development of trend profiles could be of indirect value to the update of National Biodiversity Strategy and Action Plans (NBSAPs), which are required to be formulated and produced (in accordance with Article 6 of the CBD Convention), by all Contracting Parties. However there is currently no legally binding obligation to update NBSAPs once they have been completed and submitted by Contracting Parties.

Given that future opportunities for the development of trend profiles and information is likely to be of most value to CMS and CBD Conventions, the following summary of suggested actions is primarily focused on these international legislative agreements.

#### *6.7. Actions applicable to the Convention on Migratory Species and the Convention on Biological Diversity*

- Agencies developing trend profiles are encouraged to work closely with their National Focal Points for CBD and CMS Conventions, to continue to identify further opportunities for the development of trend profiles that will assist with international reporting obligations.
- Agencies developing trend profiles are encouraged to work closely with National Focal Points for CBD and CMS Conventions to monitor calls for the submission of status and trends reports on all natural heritage elements.

#### *6.8. Convention on Biological Diversity*

- Agencies are encouraged to develop trend profiles for Priority Species identified in National Biodiversity Action Plans.



- Agencies are encouraged to regularly monitor notifications from the CBD Secretariat for opportunities to supply the COP with special studies. This can be achieved by regular checking of the CBD website <http://www.biodiv.org> or by close collaboration or contact with organisations working closely with international and regional conventions and agreements (UNEP-WCMC).
- Agencies are encouraged to support key thematic programmes of work as identified by the CBD (marine and coastal biodiversity, biological diversity of inland water ecosystems, agricultural biodiversity, forest biological diversity) as well as cross-cutting issues (biodiversity indicators, alien species).

Agencies are particularly encouraged to provide input into the call to Contracting Parties to submit thematic reports on programmes of work to be discussed at COP 7 (March 2004), on mountain ecosystems and protected areas. These reports should be submitted to the CBD Secretariat on 31 October 2002 (mountain ecosystems) and 30 March 2003 (protected areas).

In addition COP 6 (April 2002) called for a comprehensive assessment of the status and trends of the agricultural biodiversity is to be undertaken. The draft document is to be complete in 2003, with the final document ready for discussion at COP 8 (2007). Agencies are encouraged to engage with National Focal Points and the CBD Secretariat to identify how they may be able to input into this process.

- Agencies are encouraged to monitor closely the development of biodiversity indicators for the CBD, including collaboration with their CBD National Focal or organisations working closely with the Convention and supporting the CBD Secretariat e.g. UNEP-WCMC.
- Agencies are encouraged to respond to specific calls from the CBD for biodiversity trend information.
- Agencies are encouraged to engage with Ad Hoc Technical Expert Groups (AHTEG). These groups are being convened to look at the development of CBD programmes of work or cross-cutting issues. Frequently these groups are requested to assess the status and trends of specific habitats and ecosystems. Trend profiles and trend information as a whole which have already been developed are likely to be of significant value to such processes.

Known AHTEG groups into which input by agencies (through their national delegation) may be of value include:

- Ad Hoc Technical Expert Group on mountain biodiversity – December 2002 and June 2003
- Ad Hoc Technical Expert Group on protected areas – April 2003
- Ad Hoc Technical Expert Group meeting on restoration of degraded ecosystems and threatened species – September 2004
- Ad Hoc Technical Expert Group meeting on targets, baselines and indicators – November 2004

Further information on these meetings can be found via the CBD website.



### *6.9. Future requirements for information on the state of natural heritage*

This report has identified the principal reporting obligations for an agency such as SNH, within the context of the United Kingdom's international obligations. The two major sources of reporting requirements of relevance to the state of the natural heritage are the Convention on Biological Diversity and EU Directives (Annexes 2 and 3). A timetable of past and future UK reporting requirements to international conventions and EU Directives is provided in Annex 4.

The demand for indicators regarding the state and pressures on the environment is rapidly expanding, as evidenced by the set of 400 indicators recently proposed by the European Environment Agency. This report provides an assessment (Table 4) of the relevance of many of these indicators to the 15 trend profiles developed by UNEP-WCMC. Since the selection and definition of these indicators is a consultative process currently underway within the EU it is not possible to predict which indicators will be adopted. Participation in this consultative process would greatly assist both influencing and anticipating future reporting requirements, as well as learning of data sets and methods developed by similar agencies.

In addition to the European level reporting and monitoring programmes there are several high quality national environmental reporting systems and websites. The national internet information sources are listed in Annex 5. Countries with particularly extensive and user-friendly websites include Norway, Sweden and the Netherlands. As in the United Kingdom, several countries' environmental monitoring and indicator development programmes are now being designed to meet a suite of indicators for sustainable development targets. However, each country has defined their own targets and measures of sustainable development and the resulting indicators are rarely directly comparable.

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<http://www.biodiv.org/doc/guidelines/nr-abs-gd-lns-en.pdf>

Convention on Biological Diversity Guidelines for Thematic Reports on Forest Ecosystems  
<http://www.biodiv.org/doc/guidelines/nr-for-gd-lns-en.pdf>

## ANNEX 1 - Abbreviations used

ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area
AEWA	Conservation of African-Eurasian Migratory Waterbird Agreement
BADC	British Atmospheric Data Centre
BAS	British Antarctic Survey
BCT	Bat Conservation Trust
BODC	British Oceanographic Data Centre
BRO	British Rainfall Organization
BTO	British Trust for Ornithology
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CEH	Centre for Ecology and Hydrology
CORINE	Co-ordinating Information on the European Environment)
DARDNI	Department of Agriculture and Rural Development Northern Ireland
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EC	European Commission
ECN	Environmental Change Network
EEA	European Environment Agency
EN	English Nature
EDMED	European Directory of Marine Environmental Data Sets
EGOS	European Group on Ocean Stations
EIC	Environmental Information Centre
EU	European Union
EUROBATS	European Union Agreement on the Conservation of Bats in Europe
FAO	Food and Agriculture Organization (of the United Nations)
FRS	Fisheries Research Services
GAW	Global Atmosphere Watch of WMO
GECC	Global Environmental Change Committee
GHG	Greenhouse Gas
GLOSS	Global Sea Level Observing System
GOOS	Global Ocean Observing System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GRAS	GNSS Receiver for Atmospheric Sounding
GSN	GCOS Surface Network
GTN-G	Global Terrestrial Network – Glaciers
GTN-P	Global Terrestrial Network – Permafrost
GTOS	Global Terrestrial Observation System
IERM	Institute for Ecology and Resource Management
I-WeBS	Irish Wetland Bird Survey
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IUCN	International Conservation Union
JNCC	Joint Nature Conservation Committee
JONSIS	Joint North Sea Information System
LCM	Land Cover Map
MEDAG	Marine Environmental Data Action Group
MERMAID	Marine Environmental Resource Mapping and Information Database

MNCR	Marine Nature Conservation Review
MSL	Mean Sea Level
NBN	National Biodiversity Network
NBMP	National Bat Monitoring Programme
NEODC	NERC Earth Observation Data Centre
NERC	Natural Environment Research Council
NGLA	National Groundwater Level Archive
NMMP	National Marine Monitoring Programme
NRFA	National River Flow Archive
NWA	National Water Archive
POL	Proudman Oceanographic Laboratory
PSMSL	Permanent Service for Mean Sea Level
RAL	Rutherford Appleton Laboratory
RSPB	Royal Society for the Protection of Birds
SAC	Special Areas of Conservation
SE	Scottish Executive
SEPA	Scottish Environmental Protection Agency
SMRU	Sea Mammal Research Unit (UK)
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
SOC	Southampton Oceanography Centre
SST	Sea Surface Temperature
UK	United Kingdom
UKAWMN	UK Acid Waters Monitoring Network
UKHO	UK Hydrographic Office
UK WeBS WWT	United Kingdom Wetland Bird Survey Wildfowl and Wetlands Trust
UNECE	UN Economic Commission for Europe
UNEP	United Nations Environment Programme
UNEP-WCMC	UNEP World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WCRP	World Climate Research Programme
WMO	World Meteorological Organization
WWF	World Wide Fund for Nature
WWW	World Weather Watch (of WMO) or World Wide Web
CAP	Common Agricultural Policy (EU)
CEE	Central and Eastern Europe
CCE	Coordinating Centre for Effects (UNECE)
CFCs	Chlorofluorocarbons
CLRTAP	Convention on Long Range Transboundary Air Pollution (UNECE)
DG III EC	Directorate-General III (Industry); now DG Industry DG XI EC
Directorate-General XI	(Environment, Nuclear Safety and Civil Protection); now DG Environment
DMI	Direct Material Input
DPSIR	Driving forces, Pressures, State, Impact, Responses
5EAP	fifth environmental action programme of the European Union
ECU	European Currency Unit (now EUR or euro)



EMEP	Cooperative Programme for Monitoring and Evaluation of the Long Range Transmission of Air Pollution in Europe
ETC/AE	European Topic Centre on Air Emissions
ETC/AQ	European Topic Centre on Air Quality
ETC/IW	European Topic Centre on Inland Waters
ETC/LC	European Topic Centre on Land Cover
ETC/NC	European Topic Centre on Nature Conservation
ETC/W	European Topic Centre on Waste EU European Union
Eurostat	Statistical Office of the European Union (Luxembourg)
GDP	gross domestic product
GWP	global warming potential HCFCs hydrochlorofluorocarbons
HFCs	hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change IPPC Integrated Pollution Prevention and Control (EU Directive)
ktonnes	thousand tonnes
MAC	maximum admissible concentration
MSC-W EMEP	Meteorological Synthesising Centre-West (UNECE)
New Cronos	general statistical database at Eurostat
NMVOCS	non-methane volatile organic compounds NO <sub>x</sub> nitrogen oxides, including nitric oxide (NO) and nitrogen dioxide (NO <sub>2</sub> )
OECD	Organisation for Economic Cooperation and Development
ODP	ozone-depleting potential
OSPAR	Joint Oslo and Paris Commissions
PCBs	polychlorinated biphenyls
PFCs	perfluorocarbons
PM	particulate matter POPs persistent organic pollutants
ppb	parts per billion ppm parts per million
Ramsar	Convention on Wetlands of International Importance especially as Waterfowl Habitat
RIVM	National Institute of Public Health and Environmental Protection, the Netherlands
TMR	Total Material Requirement toe tonnes of oil equivalent
UNECE	United Nations Economic Commission for Europe
UUA	utilised agricultural area
VOCs	volatile organic compounds

## ANNEX 2 – Summary of reporting obligations of UK International Environmental Conventions

International Convention	Summary Reporting Needs
Convention on Biological Diversity (CBD)	<p>National Report (every 4 years) on measures taken for the implementation of the Articles of the Convention and Decisions of CoPs and their effectiveness in meeting the objectives of the Convention (conservation of biodiversity, sustainable use of biological resources, and equitable sharing of the benefits)</p> <p>Periodically provided detailed thematic reports (alien species, forest biodiversity) on one or more subject areas for in-depth discussion at CoPs. These are usually related to a particular Article of the Convention</p>
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar)	<p>Completed Ramsar datasheet should be submitted to Bureau upon designation of site</p> <p>Change in ecological character of a site (Montreux Record)</p> <p>Report for CoP 7</p>
Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage)	<p>Every Party shall submit to the World Heritage Committee an inventory of property forming part of the cultural and natural heritage</p> <p>Parties shall in the reports they submit to the General Conference of UNESCO on dates and in a manner to be determined by it, give information on the legislative and administrative provisions which they have adopted and other action which they have taken for the application of this Convention</p>
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	<p>Annual report containing a summary of permits and trade in species included in Appendices I, II and III of the Convention</p> <p>Biennial report on legislative, regulatory and administrative measures taken to enforce the provisions of the Convention</p>
Convention on the Conservation of Migratory Species of Wild Animals (CMS Bonn)	<p>On accession to this Convention parties that are "Range States" for migratory species specified in Appendices I and II to the treaty, are required to provide information on the status and population of these species and measures they are taking to protect these species and their habitats.</p>

	<p>Every three years Parties that are "Range States" for migratory species specified in Appendices to the treaty are required to provide information on the status and population of these species and measures they are taking to protect these species and their habitats. This report updates previous reports.</p> <p>Updating report by parties</p>
CMS African Eurasian Migratory Waterbirds Agreement (AEWA)	<p>Triennial national report - Report on the implementation of the Agreement with reference to conservation measures undertaken by each Party with respect to migratory waterbirds</p> <p>Information on hunting legislation - Parties to inform the Secretariat about their legislation relating to the hunting of populations listed in Table 1 of Annex 3 on a continuous basis.</p> <p>Estimates relating to total annual take for each population - Parties to provide the Secretariat with estimates of the total annual take for each population (of species listed in Table 1 of Annex 3 of the Agreement), when available.</p> <p>Information on the damage caused by waterbird populations - Parties to inform the Secretariat about damage, in particular to crops, caused by populations listed in Table 1 of Annex 3.</p>
CMS Agreement on the Conservation of Bats in Europe (EUROBATS)	<p>National Report on Implementation - Parties to annually inform the Secretariat about developments over the previous year, especially where there have been major changes to the status of any species, and on what research has been considered, begun or completed</p>
CMS Agreement on the Conservation of Small Cetaceans in the Baltic and North Seas (ASCOBANS)	<p>Triennial national report - Detailed report covering progress made and the difficulties experienced in implementing the agreement (on the protection of small cetaceans in the Baltic and North Sea region)</p> <p>Annual National Report - Brief report covering progress made and difficulties experienced in implementing the agreement (on the protection of small cetaceans in the Baltic and North Sea)</p>



<p>Convention on the Conservation of European Wildlife and Natural Habitats (Berne)</p>	<p>Biennial National Report on the exceptions made to the provisions of the Convention. In particular this requires the notification of exceptions to the total prohibition of the taking of wild flora and fauna specified in Appendix I and II of the Convention</p> <p>Information on species receiving protection in territory - Parties shall provide information on the species receiving complete protection on its territory and not included in Appendices I and II</p> <p>Every 3 years produce a General Report on the implementation of the convention, particularly legislation, regulation and other actions to conserve listed species of flora and fauna and their habitats.</p>
<p>International Convention for the Regulation of Whaling</p>	<p>Annual Scientific Progress Reports submitted by each contracted party</p> <p>Provision of a checklist of information required under Section VI of the Schedule (Information required from whaling operations including: operational details; biological details; scientific permits; laws and regulations)</p>
<p>United Nations Convention on the Law of the Sea (UNCLOS)</p> <ul style="list-style-type: none"> <li>• Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea (UNCLOS) of 10 December 1982</li> </ul> <p>Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNCLOS)</p>	<p>Deposit of charts or co-ordinates regarding the outer limits of maritime zones and an obligation of due publicity for certain legislation.</p> <p>Contracting Parties also report annually on matters pertaining to fisheries.</p>

<p>Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR)</p>	<p>Information from Contracting Parties is collected on a regular or annual basis for:</p> <p>Annex I - on the prevention and elimination of pollution from land-based sources (particularly with regard to emissions and discharges of selected, hazardous substances from point and diffuse sources to assess the implementation of Decisions and Recommendations)</p> <p>Annex II - on the prevention and elimination of pollution by dumping or incineration</p> <p>Annex III - on the prevention and elimination of pollution from offshore sources (emissions, chemicals, oil)</p> <p>Annex IV - on the assessment of the quality of the marine environment (Inputs data into and concentrations in marine environments e.g. selected nutrients, chemicals, emissions)</p> <p>Annex V - on the protection and conservation of the ecosystems and biological diversity of the maritime area</p>
<p>UN Convention to Combat Desertification (UNCCD)</p>	<p>Developed country Parties have, under article 6, article 20 and other articles, specific obligations to support affected CCD countries (particularly but not exclusively affected developing countries) by providing financial resources and by facilitating access to appropriate technology, knowledge and know-how.</p>
<p>Vienna Convention for the Protection of the Ozone Layer including:</p> <ul style="list-style-type: none"> <li>• Montreal Protocol on Substances that deplete the Ozone Layer</li> </ul>	<p>Information on the imports, exports, production, destruction of ozone depleting substances (ODSs) and trade with non-Parties</p>

<p>Convention on Long Range Transboundary Air Pollution (CLRTAP) Including:</p> <ul style="list-style-type: none"> <li>• 1984 Protocol to the Convention on Long range Transboundary Air Pollution on Long Term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long Range Transmission of Air Pollutants in Europe (EMEP)</li> <li>• 1985 Protocol to the Convention on Long Range Transboundary Air Pollution on further Reduction of Sulphur Emissions by at least 30 per cent</li> <li>• 1988 Protocol to the Convention on Long Range Transboundary Air Pollution concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes</li> <li>• 1991 Protocol to the Convention on Long range Transboundary Air Pollution concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes</li> <li>• 1998 Protocol on Heavy Metals</li> <li>• 1998 Protocol on Persistent Organic Pollutants (POPs)</li> <li>• 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone</li> </ul>	<p>National anthropogenic pollutant emissions: sulphur, nitrogen oxides, ammonia, non-methane volatile organic compounds (NMVOCs), carbon monoxide, methane, carbon dioxide, persistent organic pollutants (POPs) and heavy metals</p>
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<p>UN Framework Convention on Climate Change (UNFCCC)</p>	<p>Periodically produce a National Report identifying national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol</p> <p>Each Party to submit annually to the CoPa national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol (carbon dioxide (CO<sub>2</sub> ), methane (CH<sub>4</sub> ), nitrous oxide (N<sub>2</sub> O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulphur hexafluoride (SF<sub>6</sub> )).</p>
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Source: EUROLEX, EEA, UNEP-WCMC.

### ANNEX 3 – Summary of reporting obligations of key EU Environmental Directives

Directive or Regulation	Key Reporting Obligations
<p>Directive on the conservation of wild birds (79/409/EEC) (Birds Directive, 1979)</p>	<p>Member states are required to provide information on sites designated as Special Protection Areas (SPA).</p> <p>Member states are required to report Triennially on the implementation of national provisions for the conservation of wild birds and their habitats.</p> <p>Member states are to inform the European Commission when it brings into force laws, regulations and administrative provisions necessary to comply with the EU Wild Birds Directive.</p> <p>Member states are required to communicate the texts of the main provisions of national law that they adopt in the field governed by the EU Wild Birds Directive.</p>
<p>Directive on the conservation of natural and semi-natural habitats and of wild fauna and flora (92/43/EEC) (Habitats Directive, 1992)</p>	<p>Member States must propose a list of sites indicating which natural habitat types in Annex I and species in Annex II are native to its territory the sites host.</p> <p>Member States are required to undertake surveillance of the conservation status of the natural habitats and species referred to in Article 2 (every 6 years).</p> <p>Member states are required to report Biennially on derogations (exceptions and licenses granted for the taking or hunting of listed species). As well as reporting on implementation measures.</p>
<p>Bathing Water Quality Directive 76/160/EEC</p>	<p>Member states are required to report annually on national bathing water quality.</p>
<p>Directive on the quality of fresh waters needing protection or improvement in order to support fish life (Freshwater Fish Directive) (78/659/EEC) (1978)</p>	<p>Directive makes provision of water quality standards to allow fresh waters to be designated suitable for salmonoid or cyprinid fish. Fourteen parameters are required to be monitored but no numerical data are required to be</p>

	<p>reported to the Commission.</p> <p>Member states must report the total number of designations of salmonid and cyprinid fisheries and how many of those comply with the standards associated with the directive.</p> <p>Member states are required to report the total length of rivers and area of lakes designated and complying with the Directive's requirements.</p>
Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (EU Nitrates Directive)	<p>Member states are required to monitor nitrates in surface and groundwaters to establish level of agricultural nitrate pollution in nitrate vulnerable zones.</p> <p>Monitoring is to be carried out when the Directive first enters into force, and then every four years to identify areas requiring protection.</p>
Directive establishing a framework for Community action in the field of water policy (2000/60/EC) (Water Framework Directive, 23 October 2000)	<p>Establishes a strategic framework for managing the water environment. It establishes a common approach to protecting and setting environmental objectives for all groundwaters and surface waters (defined as rivers, canals, lakes, reservoirs, estuaries and coastal waters up to one mile from the shore) within the European Community.</p> <p>Member States shall ensure that a river basin management plan is produced for each river basin district lying entirely within their territory.</p> <p>Member States are required to send copies of river basin management plans and all subsequent updates to the European Commission and to any other Member State concerned within three months of their publication:</p> <ul style="list-style-type: none"> <li>▪ for river basin districts falling entirely within the territory of a Member State, all river management plans covering that national territory and published pursuant to Article 13;</li> <li>▪ for international river basin districts, at least the part of the river basin management plans covering the</li> </ul>



	<p>territory of the Member State.</p> <p>Member States shall submit summary reports for each river basin district or for the portion of an international river basin district falling within its territory: an analysis of its characteristics, a review of the impact of human activity on the status of surface waters and on groundwater and an economic analysis of water use (Article 5).</p> <p>Additionally summary reports are required for monitoring programmes designed under Article 8. Such monitoring programmes include:</p> <p>For surface waters:</p> <p>(a) the volume and level or rate of flow to the extent relevant for ecological and chemical status and ecological potential, and</p> <p>(b) the ecological and chemical status and ecological potential of surface waters.</p> <p>For groundwaters:</p> <p>Programmes covering the monitoring of the chemical and quantitative status of such environments), undertaken for the purposes of the first river basin management plan within three months of their completion.</p> <p>Member States shall, within three years of the publication of each river basin management plan or update under Article 13, submit an interim report describing progress in the implementation of the planned programme of measures.</p> <p>Member States shall ensure the establishment of programmes for the monitoring of water status in order to establish a coherent and comprehensive overview of water status within each river basin district.</p>
Framework Directive on ambient air quality assessment and management (96/62/EC)	<p>Member States are required to assess air quality (notably for sulphur dioxide, nitrogen dioxide, particulate matter and lead), throughout their territory. The requirements for those assessments</p>

	<p>depend on the nature of the area and the levels of air pollution, in relation to limit values as defined in Daughter Directives. Member States which do not have representative measurements of the levels of pollutants for all zones and agglomerations shall undertake series of representative measurements, surveys or assessments in order to have the data available in time for implementation of the Daughter Directives.</p> <p>Member states must draw up action plans indicating measures to be taken in the short term where there is a risk that limit values for any of the relevant pollutants, or alert thresholds for sulphur dioxide or nitrogen dioxide, will be exceeded.</p> <p>Member states must draw up lists of zones where the levels of one or more of the relevant pollutants is above the limit value, or between the limit value and any margin of tolerance shown in Schedule 1 of the Directive.</p> <p>Member states must ensure that up-to-date information on ambient concentrations of each of the relevant pollutants is routinely made available to the public.</p>
Regulation (EEC) No 3528/86 on the protection of the Community's forests against atmospheric pollution	<p>Member States must produce regular reports on forest health with reference to atmospheric pollution (notably an inventory of damage), following the establishment of a network of observation points.</p> <p>The European Commission is required to publish an annual activity report relating to EU supported pilot projects and field experiments designed to improve the understanding of atmospheric pollution in forests and its effect; improve methods of observing and measuring damage and establish methods for the restoration of damaged forests.</p>
Regulation (EEC) No 2158/92 on the protection of the Community's forests against fire	<p>Member states are required to classify their territory according to the degree of forest-fire risk and forward to the European Commission forest-fire</p>

	<p>protection plans for the areas classified as high risk and medium risk.</p> <p>Member states shall prepare an assessment of the effectiveness of the different types of measures taken to reduce forest fires and submit to the Commission each year their projects or programmes for improving the protection of forests against fire.</p>
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Source: EEA 1999, EUROLEX, DG Environment.





# ANNEX 4 – UK International Conventions Reporting Commitments Timetable 1998-2006

[Note: The dates listed are not standardised- some refer to published date, some refer to date on which reports were written and deadlines for reporting].

Multilateral Environmental Agreements/Directive	Cycle	Report type	1998	1999	2000	2001	2002	2003	2004	2005	2006
Convention on Biological Diversity	4 year		1 <sup>st</sup> Report (Jan 1998)			Cop6 Apr '02 2 <sup>nd</sup> Report (May 2001)	Mountain Eco-systems (Oct 2002)		Cop7 Mar '04 tbc 3 <sup>rd</sup> Report	Mid May deadline for Cop8 reports	
CBD Thematic Reports	<i>Irregular- 2 year approx.</i>				Alien Species (Sep 2000)  Access and Benefit sharing (Dec 2000)	Forest Eco-systems (May 2001)		Protected Areas (Mar 2003)  Transfer of technology (Mar 2003)			
UK BAP	5 year					1 <sup>st</sup> Report (MBR) (1995-2000) (Feb 2001)	Reporting 2002 Online system (Sept 2002)			Lead Partner Report?	
EC Habitats Directive (EC 92/43)	6 year	Implementation				1 <sup>st</sup> Report Jun 1994 - Dec 2000 (Sep 2001)					2 <sup>nd</sup> Report Jan 2001- Dec 2006
EC Habitats Directive (EC 92/43) Derogation Report	2 year	Derogation		Jan '97 - Dec '98 (Mar 1999)			Jan '99 - Dec 01 (Mar 2002)			Jan 02 - Dec 04 (Mar 2005)	
EC Birds Directive (EC 79/409)	3 year	Implementation		1996-1998 (Aug1999)			1999-2001 (Aug 2002)			2002-2004 (Aug 2005)	
EC Birds Directive (EC 79/409) Derogation Report	<i>Annual</i>	Derogation	Jan '97 - Dec '97 (May 1998)	Jan '98 - Dec '98 (May 1999)	Jan '99 - Dec '99 (May 2000)	Jan 2000 - Dec '00 (May 2001)	Jan 2001- Dec '01 (May 2002)				
Ramsar Convention	3 year		1996 - 1998 (Sep 1998)			1999-2001 (Sep 2001)					

Convention on International Trade in Endangered Species (CITES)	Annual	Trade	1998 (Dec 1998)	1999 (Dec 1999)	2000 (Dec 2000)	2001 (Dec 2001)	2002 (Dec 2002)				
CITES	2 year	Implementation	1997 - 1998 (Dec 1998)		1999-2000 (Dec 2000)		2001-2002 (Dec 2002)				
Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	4 year	Implementation		1995 - 1998 (Jun 1999)				1999 - 2002 (Jun 2003)			
Bern Convention Derogation report	2 year	Derogation		1997 - 1998 (Jun 1999)		1999 - 2000 (Jun 2001)					
Convention on the Conservation of Migratory Species of Wild Animals (Bonn)	2-3 year			Cop6 Nov '99 1997 -1999 (Nov 1999)			Cop7 Sep 02 1999-2001 (Sep 02)		Cop8		
Bonn Convention (Bats Agreement)	3 year	Implementation	1995-1997 (Jun 1998)			1998-2000 (Jun 2001)					
Bonn Convention (AEWA)	3 year	Implementation					1 <sup>st</sup> Report 1999-2002 (Sep 2002)				
Bonn Convention (ASCOBANS)	Annual	Implementation	Jan '97 - Dec '97 (Jun 1998)	Jan '98 - Dec '98 (Jun 1999)	Jan '99 - Dec '99 (Jun 2000)	Jan 2000 - Dec '00 (Jun 2001)	Jan 2001 - Dec '01 (Jun 2002)				
Digest of Environmental Statistics	Annual		Report No. 21 (Oct 1998)	Report No. 22 (Oct 1999)	Electronic (Oct 2000)	Update (Oct 2001)	Update (Oct 2002)				
Europe's Environment (The Dobris Assessment)	5 year		2 <sup>nd</sup> report (triennial) 1994-1996 (Jun 1998)				3 <sup>rd</sup> report (5-yearly) 1997-2001 (Jun 2002)				



## **ANNEX 5 - Index to Information sources**

### **Global Conventions**

Convention on Biological Diversity (CBD) <http://biodiv.org>

World Heritage Convention <http://www.unesco.org>

CITES <http://www.cites.org>

CMS <http://www.wcmc.org.uk/cms/index.html>

Ramsar: <http://www.ramsar.org>

United Nations Framework Convention on Climate Change  
<http://unfccc.int/>

UNFCCC Greenhouse Gas Database  
<http://ghg.unfccc.int/>

Convention on Long-Range Transboundary Air Pollution  
(Tables of anthropogenic emissions in the ECE region)  
<http://www.unece.org/env/lrtap/>

Tables of anthropogenic emissions in the ECE region.  
[http://www.emep.int/emis\\_tables/tab1.html](http://www.emep.int/emis_tables/tab1.html)

EU Ozone data as submitted by countries in the framework of EU Directive 92/72/EEC on Air Pollution by Ozone.  
<http://www.etcaq.rivm.nl/databases/ozone.html>

Environmental Treaties and Resource Indicators (ENTRI)  
<http://sedac.ciesin.org/entri/>

### **Global Information Sources**

EUR-Lex: <http://europa.eu.int/eur-lex/en/index.html>

IUCN The World Conservation Union  
<http://www.iucn.org/>

Global Invasive Species Database

<http://www.issg.org/database/welcome/>

IUCN Invasive Species Specialist Group (ISSG)

<http://www.issg.org/>

World Resources Institute

<http://www.wri.org/>

Worldwatch Institute

<http://www.worldwatch.org/>

Earth Trends (World Resources Institute (WRI))

<http://earthtrends.wri.org/>

UNEP-World Conservation Monitoring Centre

<http://www.unep-wcmc.org>

United Nations Commission on Sustainable Development

<http://www.un.org/esa/sustdev/csd.htm>

United Nations Environment Programme (UNEP)

<http://www.unep.org>

## **Marine**

UN FAO Fisheries Statistics

<http://www.fao.org/fi/statist/statist.asp>

WCMC. 1998. *Freshwater Biodiversity: a preliminary global assessment*  
Groombridge, B and Jenkins M. (Eds). WCMC Biodiversity Series No. 8 WCMC,  
World Conservation Press, Cambridge.

[http://www.unep-wcmc.org/information\\_services/publications/freshwater/toc.htm](http://www.unep-wcmc.org/information_services/publications/freshwater/toc.htm)

## **Forestry Statistics**

UN Food and Agriculture Organization (FAO)

<http://www.fao.org/forestry>

## **Agriculture**

UN Food and Agriculture Organization (FAO)

<http://www.fao.org>

International Fertilizer Industry Association (IFIA) Fertiliser Statistics

<http://www.fertilizer.org/ifa/statistics/STATSIND/summary.asp>

NERC Centre for Population Biology, Imperial College - The Global Population Dynamics Database. <http://www.sw.ic.ac.uk/cpb/cpb/gpdd.html>

European Union

European Commission: Environment

[http://europa.eu.int/comm/environment/index\\_en.htm](http://europa.eu.int/comm/environment/index_en.htm)

DG Agriculture - Agriculture in the European Union Statistical and economic information 2000

[http://europa.eu.int/comm/agriculture/agrista/2000/table\\_en/index.htm](http://europa.eu.int/comm/agriculture/agrista/2000/table_en/index.htm)

DG Agriculture - Agriculture in the European Union Statistical and economic information 1999

[http://europa.eu.int/comm/agriculture/archiveagrista/index\\_en.htm](http://europa.eu.int/comm/agriculture/archiveagrista/index_en.htm)

European Environment Agency (EEA)

<http://www.eea.eu.int/>

Eurostat <http://europa.eu.int/comm/eurostat/>

EIONET (EEA) <http://eionet.eea.eu.int/index.shtml>

Environmental Signals 2000 (EEA)

<http://reports.eea.eu.int/signals-2000/en>

SEDAC – Socio and economic data centre

<http://sedac.ciesin.org/>

OECD Selected Environmental Data

<http://www.oecd.org/pdf/M00019000/M00019556.pdf>



## **National Information Sources**

### **Denmark**

Danish National Protection Agency

<http://www.mst.dk/homepage/>

Danish Forest and Nature Agency

<http://www.sns.dk/internat/>

The National Environmental Research Institute

[http://www.dmu.dk/forside\\_en.asp](http://www.dmu.dk/forside_en.asp)

Danish Institute for Fisheries Research

[http://www.dfu.min.dk/default\\_uk.htm](http://www.dfu.min.dk/default_uk.htm)

Danish Department for Inland Fisheries

<http://www.dfu.min.dk/ffi/FFI-ENG/index.htm>

Declaration of Contents, Bag of game statistics.

<http://www2.dst.dk/internet/varedeklaration/en/V01116.htm>

### **Ireland**

ENFO

<http://www.enfo.ie/>

Determination and mapping of critical loads for sulphur and nitrogen and critical levels for ozone in Ireland

<http://www.ucd.ie/~ferq/Research/Projects/Clouds/emep.html>

### **Finland**

Finnish Environment

<http://www.vyh.fi/eng/environ/>

Finland's Indicators for Sustainable Development 2000 (v. good)

<http://www.vyh.fi/eng/environ/sustdev/indicat/inds2000.htm>

Finnish Game and Fisheries Research Institute

<http://www.rktl.fi/english/>

<http://www.rktl.fi/english/statistics/marine/index.html>

Catches and the value of catches (without VAT) in freshwater fisheries in Finland in 1996.

<http://www.rktl.fi/english/statistics/freshwater/freshwater1996.htm>

<http://www.rktl.fi/english/statistics/freshwater/freshwater1998.htm>

Finish Fisheries Statistics (2000)

<http://www.rktl.fi/tilasto/taskutilasto.pdf>

<http://www.mmm.fi/english/>

Ministry of Agriculture and Forestry - Indicators for Sustainable Use of the Renewable Natural Resources in Finland

[http://www.mmm.fi/english/landwater/natural\\_resources/administration/indicators/INDICA~1.HTM](http://www.mmm.fi/english/landwater/natural_resources/administration/indicators/INDICA~1.HTM)

Ministry of Agriculture Annual Report 2000

<http://www.mmm.fi/english/publications/annualreport2000.doc>

## **Germany**

German Federal Environment Ministry

<http://www.bmu.de/english/fset800.php>

## **The Netherlands**

The National Institute of Public Health and the Environment

<http://www.rivm.nl/en/>

Dutch Environmental Data Compendium 2001

<http://arch.rivm.nl/environmentaldata/>

## **Norway**

Statistics Norway

<http://www.ssb.no/english/guide/>

State of the Environment Norway (selected biodiversity statistics)

<http://www.environment.no/Geografi/Geografi.stm>

Norwegian Ministry of Fisheries

<http://odin.dep.no/fid/engelsk/>

Norwegian Directorate of Fisheries

<http://www.fiskeridir.no/english/index.html>

Norwegian Fisheries landing Statistics 1996-99 (by species)

[http://www.fiskeridir.no/english/pages/statistics/norwegian\\_catches.pdf](http://www.fiskeridir.no/english/pages/statistics/norwegian_catches.pdf)

The Norwegian Zoological Society (Norsk Zoologisk Forening; NZF)

<http://www.zoologi.no/english/index.htm>

Natural Resources and the Environment 2001. Norway.

[http://www.ssb.no/english/subjects/01/sa\\_nrm/nrm2001/](http://www.ssb.no/english/subjects/01/sa_nrm/nrm2001/)

Directorate for Nature Management

<http://english.dirnat.no/>

European Critical Loads Mapping Programme

<http://www.rivm.nl/cce/>

The Norwegian Pollution Control Authority (SFT)

<http://www.sft.no/english/>

## **Scotland**

<http://www.scotland.gov.uk/biodiversity/documents/species.pdf>

Scottish Executive

<http://www.scotland.gov.uk/>

Scottish Executive Environment Group

<http://www.scotland.gov.uk/environment/>



## **Fisheries Data**

<http://www.scotland.gov.uk/library/documents-w1/ssfs-05.htm>

## **Sweden**

Swedish Ministry for the Environment

[http://miljo.regeringen.se/english/english\\_index.htm](http://miljo.regeringen.se/english/english_index.htm)

Swedish Forest Inventory

<http://www-nfi.slu.se/>

Swedish EnviroNet

<http://smn.environ.se/miljonat/english/index.htm>

Swedish Environmental Protection Agency

<http://www.internat.environ.se/index.php3>

Swedish Board of Agriculture

<http://www.sjv.se/net/SJV/Home>

Swedish Agriculture Statistics:

Swedish Board of Fisheries (Swedish)

<http://www.fiskeriverket.se/>

Statistical reports Agriculture, forestry and fishery (JO)

<http://www.scb.se/eng/publkat/sm/jordbruk.asp>

Swedish Forestry Statistics

<http://www.svo.se/fakta/stat/ssi/engelska/default.htm>

Swedish Environmental Quality Objectives.

<http://www.internat/environ.se/documents/objectiv/objectiv.htm>

## **United Kingdom**

UK Biodiversity Clearing House Mechanism

<http://212.219.37.111/>

The UK CHM supports the Convention on Biological Diversity by promoting scientific and technical co-operation and information exchange through the provision of access to relevant information and expertise.

UK National Biodiversity Archive

<http://www.ukwildlife.com/nbn/scon.htm>

UK National Air Quality Information Archives

<http://www.aeat.co.uk/netcen/airqual/>

Butterfly Monitoring

<http://bms.ceh.ac.uk/>

UK Countryside Survey 2000

<http://www.cs2000.org.uk/>

UK Statistics

<http://www.statistics.gov.uk/>

Environment Agency (England and Wales)

<http://www.environment-agency.gov.uk>

England and Wales Rod and net catch of salmon, 1960 to 2000

<http://www.environment-agency.gov.uk/commondata/103608/208153>

Rivers of Fair or Good Quality in England and Wales

[http://www.environment-agency.gov.uk/commondata/103196/river\\_bio/](http://www.environment-agency.gov.uk/commondata/103196/river_bio/)

UK Breeding Bird Survey 2000 (BTO)

<http://www.bto.org/survey/BBSreport00.pdf>

UK Bird Trends in the Wider Countryside (BTO)

<http://www.bto.org/birdtrends/index.htm>

UK Climate Impacts Programme

<http://www.ukcip.org.uk/>



## UK Mean Temperature

MONTHLY MEAN CENTRAL ENGLAND TEMPERATURE 1644-2001

[http://www.met-office.gov.uk/research/hadleycentre/CR\\_data/Monthly/HadCET\\_act.txt](http://www.met-office.gov.uk/research/hadleycentre/CR_data/Monthly/HadCET_act.txt)

## Hadley Centre for Climate Change

<http://www.met-office.gov.uk/research/hadleycentre/obsdata/HadEWP.html>

England and Wales Mean Precipitation data 1766 - 2001

[http://www.met-office.gov.uk/research/hadleycentre/CR\\_data/Monthly/HadEWP\\_act.txt](http://www.met-office.gov.uk/research/hadleycentre/CR_data/Monthly/HadEWP_act.txt)

British Atmospheric Data Centre (BADC) at Rutherford Appleton Laboratory (RAL):

[www.badc.rl.ac.uk/index.html](http://www.badc.rl.ac.uk/index.html). Responsible for atmospheric sciences data.

British Oceanographic Data Centre (BODC) at Proudman Oceanographic Laboratory

(POL): [www.bodc.ac.uk](http://www.bodc.ac.uk). Responsible for marine data.

National Water Archive (NWA) at Centre for Ecology and Hydrology (CEH):

[www.ceh.ac.uk/data/nra.htm](http://www.ceh.ac.uk/data/nra.htm)

Responsible for NERC's hydrological data and for the UK Government's National River Flow and Groundwater Level Archives.

Environmental Information Centre (EIC) at CEH: [www.ceh.ac.uk/data/eic.htm](http://www.ceh.ac.uk/data/eic.htm).

Responsible for all other NERC terrestrial and freshwater data.

NERC Earth Observation Data Centre (NEODC) at RAL: [www.neodc.rl.ac.uk](http://www.neodc.rl.ac.uk).

Responsible for Earth Observation data held by NERC, notably the satellite imagery archive at Dundee, imagery from NERC airborne surveys, and NERC's archive of imagery from commercial sources.



